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ABSTRACT

Compiled by the members of the U.S. Senate Subcommittee on Rural Development, this series of papers presents varying views on rural land-use issues. The 19 papers are titled as follows: (1) "Planning: Some questions, Answers, and Issues"; (2) "Evolution of Planning Theory and Practice: A Response to Changing Problems and Institutions"; (3) "The Legal and Governmental Framework for Planning"; (4) "The Politics of Planning"; (5) "Planning Practice and Techniques"; (6) "Implementing the Products of Comprehensive Planning: The Pueblo Experience"; (7) "Integrating Natural Resources into Areawide and Local Planning: The Southeastern Wisconsin Experience"; (8) "Rural New York State's Agricultural Districts"; (9) "An Overview of the Taxation of Open Land"; (10) "Differential Assessment of Open Space and Farmland"; (11) "Status of Ad Valorem Taxation on Rural Land in Georgia--1972"; (12) "Farming in the City's Shadow"; (13) "Human Considerations in Land Use"; (14) "Major Uses of Land in the United States: Summary for 1969"; (15) "Land Use Change in the Southern Mississippi Alluvial Valley, 1950-69"; (16) "Urbanization of Land in the Northeastern United States"; (17) "Urbanization of Land in the Western States"; (18) "Improving Water Quality Management Planning in Nonmetropolitan Areas"; (19) "Watershed Models: Tools in Planning Land Management for Water and Pollution Control". (JC)

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AGRICULTURE, RURAL DEVELOPMENT, AND THE USE OF LAND

A SERIES OF PAPERS COMPILED BY THE

SUBCOMMITTEE ON RURAL DEVELOPMENT

OF THE

COMMITTEE ON AGRICULTURE AND FORESTRY

UNITED STATES SENATE

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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FOREWORD

Rural residents have generally been antagonistic toward legislation which prescribes the use of private land. Many of these fears, I believe, are based on legitimate concerns. For instance, it could prove tragic if the land use responsibility for a State were placed in the hands of those who have only been trained to manage the use of densely populated urban systems.

Even if these planners were men of good will, their ignorance of the rural setting—of light density small towns, of forest land, farm land and watersheds—could lead to decisions that possibly could cause considerable damage.

Nevertheless, farmers, foresters, and our conservation districts have always maintained a considerable concern for the use of rural land, and today a number of problems require that we reconsider some of the issues involved here.

For instance, urban commercial development is increasingly encroaching on our farm and forest lands. Vacation home development at the head of key watersheds will become a heightening problem. As a result of urban pressures, some farmers are literally being taxed off the land through increased property taxes. New York, New Jersey, Maryland, and California have taken or shortly will take action to protect the farmer's land investment.

This series of papers is an attempt to examine some of the issues involved in the use of rural land. The members of the subcommittee do not necessarily endorse all of the views taken by the authors.

DICK CLARK, *Chairman,*
Subcommittee on Rural Development.

AGRICULTURE, RURAL DEVELOPMENT, AND THE USE OF LAND

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A PRIMER ON PLANNING

PLANNING: SOME QUESTIONS, ANSWERS, AND ISSUES

[By Dorn C. McGrath, Jr.*]

One of the most important and least understood aspects of contemporary American life is the planning function in government. Planning, of course, is a fundamental responsibility of both government and private enterprise, but it is also a subject about which most of American society is strongly ambivalent. Curiously, long-range, comprehensive, innovative planning based on advanced technology and information is expected and admired in private enterprise, while the same is viewed with suspicion, if not alarm, in government at almost any level.

It is traditional for political scientists, the popular press, and the public at large to dwell on governmental failure in contrast with corporate success whenever the consequences of planning are being assessed. Advocacy of planning is an article of faith easily invoked by political leaders of every persuasion. But in practice the weight of planning information and the discipline of the process as bases for spending public funds or adopting public policy are kept at arm's length from the process of political decisionmaking or shielded from public view.

The price of not practicing the kind of public planning that political leaders preach has been high for all American taxpayers. Thus it is appropriate to explore some of the current facts, fictions, and fantasies about planning in the United States. It is important to recognize at the outset that planning, as a rational approach to problem analysis and resource use, is equally applicable to rural and urban areas and is critically important to people involved in the transition from one area to the other.

URBAN PLANNING DEFINED

A problem common to most exploratory discussions of planning is disagreement, or misunderstanding, or both, about the meaning of the term.

Planning is a deliberate process in which both governmental and private interests can and do participate. It involves the systematic collection and analysis of data on physical, social, economic, and political factors inherent in urban growth and change. It must provide for the formulation of alternatives, varying in scope according to defined objectives, for the realization of public and private objectives with respect to development and change. It requires both the application of existing forms of control and regulation of urban growth and the creation of new legal and administrative tools appropriate to newly perceived conditions. It also involves a systematic review and analysis of the effects of earlier planned and unplanned growth and resource use in order to provide a basis for formulating still other alternatives.

---

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An effective planning process must have a prescriptive capability—the capacity to synthesize from complex considerations and generate specific proposals—supported by technical information to the degree that data and judgment permit, for public review and consideration. It is this prescriptive capability of the urban planning process, based on systematic analyses of organized information, that sharply differentiates planning from the more generalized, superficial activities loosely referred to as "urban affairs."

Planners from time to time may organize findings of fact, development options, and other ideas and present them as "general plans" or "comprehensive development plans," either to help focus public discussion on alternatives or to present articulated guidelines for public and private actions that may affect the social, economic, or environmental well-being of the community. Too often in the past such plans have been viewed as "end products" of planning, and they have been vehemently attacked (and sometime zealously defended) on this mistaken basis. The comprehensiveness or scope of planning and the plans that may be produced are determined mainly by the willingness of official agencies and interested community groups to participate in the process and by the availability of information and professional planning expertise. Limitations in the scope of planning result more often from practical rather than conceptual difficulties in applying the planning process.

Congress and the executive branch have significantly reinforced both the definition and the demand for more effective planning by state and local governments. The Intergovernmental Cooperation Act of 1968 (P.L. 90–577) charged the president with establishing "rules and regulations governing the formulation, evaluation and review of federal programs and projects having a significant impact on area and community development. . . ." Maintaining a review and creating a perspective for evaluating the past consequences of such projects and projecting their potential effects is one of the fundamental requirements for an effective urban planning process. Accordingly, the Office of Management and Budget issued Circular A–95, which explicitly defines the scope of comprehensive planning. With reference to both areawide and local governmental interests, planning was defined to include:

> a. Preparation, as a guide for governmental policies and action, of general plans with respect to: (1) Pattern and intensity of land use, (2) Provision of public facilities (including transportation facilities) and other government services, (3) Effective development and utilization of human and natural resources.
>
> b. Preparation of long-range physical and fiscal plans for such action.
>
> c. Programing of capital improvements and other major expenditures, based on a determination of relative urgency, together with definitive financing plans for such expenditures in the earlier years of the program.
>
> d. Coordination of all related plans and activities of the state and local governments and agencies concerned.
>
> e. Preparation of regulatory and administrative measures in support of the foregoing.

Promulgation of such a wide-ranging definition of planning, transcending routine project coordination activities and recognizing the prescriptive functions as well as the information-gathering function of urban planning, clearly conveyed to local and areawide units of government the notion that planning should be the integrating process for the variety of traditionally separate public projects that stimulate and sustain urban development.

The early warning system of project planning advisories established as a result of the Intergovernmental Cooperation Act provides a vehicle for applying, at metropolitan and state levels, evaluative judgments to more than 100 different types of public projects having some potential to affect the quality of social and physical environments in both urban and rural areas.

Additional guidelines and interpretations covering the scope of planning responsibilities and technical content have been published by the Federal Highway Administration, Department of Housing and Urban Development, and Department of Agriculture.

The breadth and sophistication of these official guidelines is such that defining the field or interpreting the context for planning has, for all practical purposes, ceased to be a problem for professionals and enlightened laymen.

OBJECTIVES OF PLANNING

According to the American Institute of Planners, urban planning is concerned with the unified social, economic, and physical development of urban communities and their environs and of states, regions, and the nation.

The essential objective of such concern is the same as the basic objective of all governmental and political action—guiding the patterns and forces of society for the benefit of people. Planning provides the means by which a unit of government may fulfill its commitment to people by anticipating and preparing for future needs inherent in the process of urban growth and change. The primary objective of planning is thus achieved by improving the effectiveness of democratic government.

The most important objectives for planning in the decade ahead should be, first, to gain the initiative in preparing for and guiding the course and quality of development in urbanizing areas and, second, to apply contemporary technology and professional judgments to problems inherent in the consumption, conservation, and recovery of scarce resources such as land, water, and air. Gaining the initiative is an almost obvious prerequisite to finding solutions to most contemporary urban problems and even to managing such problems from year to year. Applying contemporary technology and know-how in planning the future use and recovery of land, water, and other environmental resources is a fundamental need in the face of mounting population pressures on a declining resource base.

Gaining initiative in guiding growth and coping with change should be a primary function of government, oriented at once to the needs of business, industry, institutions, and individual citizens. None of these components of society has ever achieved, nor can they achieve, their major objectives without planning. The immediate challenge is to enlist the resources of all of these groups in developing and pursuing an effective planning process, oriented ultimately to their mutual interests. This is not a theoretical or ideological challenge based on altruistic principles. It is a practical challenge dictated by national necessity and to be undertaken in the best traditions of American pragmatism.

RESOURCES FOR PLANNING

During the past 25 years the United States has created a significant institutional capability for developmental planning. Legislative mandates and inducements to plan are extensive. The Housing Act of 1949 established both incentives and requirements for cities to plan the basis for slum clearance and central-city redevelopment. This was followed in 1954 by another housing act that extended financial incentives for developmental planning to small cities, counties, states, metropolitan areas, and multistate regions. Federal highway and mass transportation legislation of the early 1960s provided requirements as well as incentives for comprehensive planning in an early attempt to identify and deal with potentially adverse environmental effects of major investments in needed public facilities.

The Intergovernmental Cooperation Act of 1968 has resulted in the establishment of more than 200 multicounty and multicity planning and project review agencies centered in major cities. The range of national interests in applying planning as a problem-solving tool was extended beyond urban areas by the rural-area programs of the Farmers Home Administration and legislation establishing the Appalachian Regional Commission and similar commissions to assess and plan remedies for the problems of areas suffering from the depletion of basic forest and mineral resources. Legislation concerned with air quality and water resources development, including critical estuarine areas, has generated planning agencies and functional jurisdictions that unite rural and urban interests.

Professional and informational resources extensively support the legislative base for planning. The period since 1950 has seen the establishment of 132 depository libraries for plans, planning studies, and reports throughout the country; the formation of nearly 100 professional consulting firms engaged exclusively in the practice of planning (as distinct from economics, architecture, or engineering); the growth in the number of recognized graduate schools in urban and regional planning from 12 to 45; and the growth of the urban planning profession from 248 to more than 7,000 members.

These are the key elements of the available institutional base for planning in the United States in the 1970s. Mobilization of these resources for the actual tasks and primary mission of gaining the initiative in planning for national growth, in contrast with planning expedient solutions to conspicuous problems under crisis conditions, is a creative challenge for planning professionals, politicians, and people alike.

INHIBITIONS TO PLANNING

Despite the creation of many basic tools and an institutional capability for planning, there remain severe inhibitions to putting what is known into practice. A key question is whether the traditional political process at every level can handle the extra burden of the sometimes harsh realities that planning analyses often produce. It is always difficult politically to vote "no" or "not now" or "not as presently designed" when a proposal promising tax returns or single-purpose benefits (such as a highway) is presented to local leaders. Adverse indications revealed by longer range planning analysis are often conveniently overlooked under such circumstances, and the accumulated results of such decisions are often deplored as the product of poor planning. It is traditional, in fact, to place the blame for ineffective plan implementation on the planning process itself or the plans produced. This amounts to blaming the victim of nonsupport for being indigent.

The real failure in ineffective plan implementation is a failure of community commitment and political leadership, rather than a failure of planning concept or technique in the preparation of alternatives among which communities may choose in deciding politically, how, when, where, and under what terms growth or change shall occur. Obviously, it is within the capability of any planning agency to prepare plans for urban development that can be implemented easily and painlessly. It is simply a matter of limiting the scope, content, and thrust of the process so that no interests are affected adversely. Such plans, however, usually are not worth making, and only those political interests that thrive on the avoidance of controversy are served.

Clearly, the greatest potential for controversy in the planning process lies in the translation of planning principles into specific proposals related to specific people or groups and times. This translation of proposals into public policies capable of affecting the rate, quality, and direction of urban growth is essentially a political undertaking. It is futile to expect any planning process by itself to effectively implement creative proposals for change in the absence of vigorous, sustained political leadership and community commitment.

Building community commitment to planning, including plan implementation, and providing the rationale for local political leadership dedicated to urban growth planning is also a federal function. This is not to suggest that federal agencies need to become involved in each local or metropolitan planning issue, but that forthright and informed federal advocacy of the salient planning principles involved in selected growth and development issues would provide needed encouragement to local leaders facing habitual opposition to planning per se or the implementation of important and controversial plan proposals. Maintaining a purely neutral or safely detached position on major urban development problems, secure in the shelter of "policy," is a traditional federal tactic, but it is one that severely reduces the credibility of the federal commitment to anticipate and deal with problems in advance through planning.

CONCLUSION

The evolution of planning in the United States since World War II has been an uneven and sometimes self-conscious adventure in domestic institution-building. Growth of the institutional capacity to plan and anticipate the possible consequences of different public actions and policies affecting people and their environments has been steady, however; and much evidence suggests that both factual and operational bases for effective planning at several levels of government have become established.

The reality of the nation's emergent capability to plan for growth and change is unmistakably reflected in the broad base of federal legislation providing incentives to plan, in the requiring of local planning as a prerequisite for a variety of federal grants-in-aid, in the planning functions in the nation's growing metropolitan areas, in the establishment of graduate degree programs designed to prepare professionals for careers in the planning field, in the accelerating growth of the ranks of the actual planning profession, and in the pervasive popular disenchantment with the economic, social, and physical consequences of haphazard urban growth. All of the foregoing simultaneously indicate the growing popularity of the objectives of planning and essential elements of the institutional base for planning per se.

But in spite of these positive indications, the fact remains that the nation has yet to realize more than a minute share of the potential benefits of planning. Some of the most practical benefits of planning, such as achieving economies of scale in systems of public facilities, preventing the emergence and aggravation of environmental hazards and nuisances, and anticipating basic demands for power, transportation, and other utility services, are not being realized because of the full generation's lag between the development of planning techniques and institutions on the one hand and public awareness, understanding, and insistence on the creative use of these techniques and institutions on the other.

Planning theory and techniques have evolved at a far faster rate in the past 20 years than have the political institutions that might benefit most from planning, and neither the general public nor most local political leaders have been able to assimilate the content of planning as an evolving field or to accommodate its offerings. As a general consequence of this lag of public understanding behind the evolution of urban planning, the nation is being deprived of major resources in planning techniques and information that could be used to improve its ability to conduct essential public business and provide a basis for anticipating future problems and opportunities inherent in national growth.

16

EVOLUTION OF PLANNING THEORY AND PRACTICE: A RESPONSE TO CHANGING PROBLEMS AND INSTITUTIONS

[By Aelred J. Gray*]

Benton MacKaye in his book *The New Exploration* (1928) observed that "Cultured man needs land and developed natural resources as the tangible source of bodily existence; he needs the flow of commodities to make that source effective; but first of all he needs a harmonious and related environment as a source of his true living."

The search for ways to achieve a "harmonious and related environment" in a rapidly changing world is a thread that runs through the history of planning in the United States. The main thrust has been to find a philosophy adequate to cope with planning problems brought about by changes in economic and institutional structures during the nation's transition from an agricultural to an urban industrial society. The flow of time and events has produced new ideas and approaches to planning problems. What was adequate for the depression years of the thirties, when the emphasis was on public works and physical development, is clearly not adequate in this day of concern for human and social problems. The history of planning thought thus reflects efforts to respond to changing national problems and situations.

Professional specialties—architecture, landscape architecture, public administration, geography, engineering, economics, sociology—have also influenced planning theory and practice. These influences are evident in discussions on the scope and nature of planning. Examples are the issues raised by proponents of resource planning as opposed to urban planning, of the city beautiful as opposed to the city efficient, of planning as representing regimentation as opposed to freedom, of physical planning as opposed to social and economic planning.

Major advances in planning thought in the United States began after 1900. The idea of comprehensive planning and many theories that still dominate the field emerged during the first 30 years in the twentieth century.

THE FORMATIVE YEARS, 1900 TO 1930

Although there were sporadic and piecemeal efforts at formal planning prior to 1900, the roots of planning were closely related to the "conservation movement' and, specifically, the administration of Theodore Roosevelt (September 1901–March 1909). The conservation movement embodied three ideas basic to accepted planning theory. One was the understanding of interrelations among resources and activities. Another was the need for a healthful living environment. Third was the idea of a rational and orderly approach to developmental problems.

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In a sense, planning has come a full circle because these same ideas are once again a dominant concern. Just as public policies concerning resource development and use were major issues in the early 1900s, so today these policies are again under public discussion and debate.

While President Roosevelt, with the help of Gifford Pinchot, spearheaded efforts to expand public understanding and support for the conservation of resources, a parallel movement attempted to gain support for city planning. The latter was an outgrowth of efforts by public officials and professional groups to deal with growing problems of sanitation, housing, and open space in urban areas.

The plan for improvement of Washington, prepared in 1901 by the Committee on the District of Columbia, was an important stimulant for city planning. This was followed by a series of events that had a major impact on the whole planning movement. In 1907 the first official city planning commission was established in Hartford, Connecticut. The Chicago plan was prepared in 1909, and that same year the first national conference on city planning was held in Washington and the School of Architecture at Harvard established the first formal course in city planning in the United States.

But while city planning seemed to have purpose and direction by virtue of efforts to establish it as an official function of local government, dissention grew within the conservation movement. Differing ideological concepts separated Roosevelt and Pinchot from many of the movement's popular enthusiasts. The Roosevelt-Pinchot faction supported the twin concepts of sound use (conservation) of resources and rational and comprehensive planning. The other faction held to a preservation view. This group, "Fearing that mushrooming cities . . . threatened the United States with social disorder . . . hoped to promote rural life as a stabilizing factor in society." It viewed the conservation movement as "oriented toward the countryside, toward nature and the eternal values inherent in nature . . ." and "had little appreciation for rational and comprehensive planning. . . ." President Roosevelt, who advocated national planning, had to rely on the preservation group for support, and, as Hays noted, "It was especially difficult to approach resource development in a rational manner when one's major political support now came from groups who looked upon the problem in moral rather than economic terms and preferred to reserve resources from economic use rather than to apply technology to their development."

These differences in concept and philosophy splintered the conservation movement. Individual groups became concerned with their own particular aspect of the conservation problem—wilderness and wildlife preservation, urban planning, water and related resource development, and national and state parks. The movement soon lost strength and support. But while the general conservation concept declined as a single, comprehensive movement, the idea of rational and orderly planning seemed to gain strength. One of the serious side effects of these events was the separation of planning for rural and for urban areas—a separation that persists today. For city planning, however, the next two decades (1910–1930) saw the formulation of some basic planning principles that are still accepted in the field.

One principle was the idea of the independent commission (which became and still is firmly entrenched in planning thought). The theory was that an official commission made up mostly of citizens with no direct ties to the government would be nonpartisan and thus could prepare a plan for a city or area that would have broad citizen support. The plan would serve as a guide for growth of the city or area and would be a basis for planning by the functional agencies (streets, parks, schools). To obtain coordination among functional agencies and key decision-makers, the commission would have as part of its membership the mayor, a representative from the legislative body, and one or two representatives from functional departments.

Another principle was the result of architecture's strong influence on early city planning thought. The major concern of city planning was physical development, and the master plan became the basic tool for giving substance to public land use policies. The strong tie to physical development emphasized maps and other forms of graphic presentation as the acceptable method for delineating the scope and content of such public policies. This position was strengthened by the organization of the American Institute of Planners in 1917. Its constitution, reflecting this point of view, defined AIP interests in planning "as expressed through the comprehensive arrangement of land use and land occupancy and the regulation thereof." Physical aspects of community development had to take into account social and economic needs, but planning for these needs was not considered central to city planning.

During this period also, the concept of districting a city for different uses emerged. In 1921, Herbert Hoover, then Secretary of Commerce, appointed a special advisory committee to draft standard state zoning enabling legislation. Edward Bassett, a lawyer who had developed a strong interest in community development, was appointed chairman. Within a year the committee had a preliminary draft of the legislation. A final version was published in 1924. Three years later, in 1927, a Standard City Planning Enabling Act was published that emphasized the importance of the master plan as a basis for the zoning ordinance. This standard act became the model for much of the zoning enabling legislation subsequently adopted by every state.

Alfred Bettman, also an attorney, along with Bassett had a great influence in conceptualizing the planning field. His writings, beginning in 1917, influenced city planning and extended the concept to planning for regions and states.

The early 1920s marked the beginning of state planning, of which the New York program must be considered a landmark. In 1924, Clarence Stein, chairman of the New York State Commission on Housing and Regional Development, engaged Benton MacKaye to outline the studies necessary for the preparation of a New York State plan. The survey work was done by Henry Wright and the study was published as a report by the Commission to the Governor in 1926. This remains today a prototype of broad areawide planning. In some ways it was more sophisticated than many present-day efforts because it recognized planning as a process and the data in the report only as a step toward achieving a satisfactory planning process in that state.

During the same period, Wisconsin too was moving to carry out an overall state development plan. Problems of settlement on marginal and cutover lands abandoned by lumber companies in northern Wisconsin became the program focus. Difficulties in providing services on a dwindling tax base led to the idea of land use classification and *ultimately to the idea of county zoning.* The College of Agriculture led this program, and many counties adopted zoning ordinances that encouraged forestry and recreation as the best use of submarginal land.

Other state efforts included the work beginning in 1921 in Michigan to conduct land resource surveys as a means of providing basic information for dealing with problems of cut-over land and tax delinquency in upper Michigan. A few other states began to plan state park systems.

The 1920s ended with a solid legislative base for planning and growing public support, particularly in cities, for a rational approach to the development of cities and related areas. There had been some experience in the techniques of city planning and some experimental planning work in a few states and regions.

THE GROWTH YEARS, 1930 TO 1960

The 1930s saw a rapid growth of city, state, and regional planning in the United States. In large measure this was a direct result of the Franklin D. Roosevelt administration, which emphasized public works and the need for relating projects to city, regional, and state plans. The National Resources Planning Board and its predecessor agencies (National Planning Board, National Resources Board, and National Resources Committee) carried on an extensive program to encourage state planning. Consultants were assigned to states to help with state programs and organize local planning activity. Most planning activities tended to follow the pattern set during the early 1920s. The standard format was organization of a "nonpartisan" independent planning commission and preparation of a master plan for the physical development of the planning jurisdiction (city, county, region, state).

But other problems emerged that directed some attention away from urban problems and the growth of cities. Increased mechanization in farming began to depopulate rural areas as people left their arms for work in major industrial centers. Programs to encourage local planning developed within the Department of Agriculture. While agricultural colleges and agencies in a few states worked with the official county planning agencies, Department of Agriculture programs tended to emphasize the county agricultural agent and farmers. Planning activities were carried out through state and local committees made up generally of farm and rural people. These programs were aimed at individual farm development and those community activities that groups of farmers could undertake cooperatively. This separation of planning in rural areas from the official planning carried on through governmental agencies persisted over the next two decades. Only now are the groups coming together as the official planning agencies give greater attention to environmental and resource problems.

Although planning agencies were being organized in most urban communities in the country, some people began questioning the approach to area planning formulated in the 1920s. A book that played a significant part in forcing a shift in basic planning theory was Robert Walker's *The Planning Function in Urban Government,* first published in 1941. Walker pointed out that "students of administration have tended to neglect the city planning commission as a factor in the local governmental process." He concluded that the nature of the planning function could "no longer be *regarded solely in terms* of preparing a master plan for the physical features of the community. . . ." Other vital considerations included such matters as the local economic structure and its relation to the national structure, the deterioration of the downtown area, relief trends, slum clearance, and public finance.

Walker also called for changes in the planning structure itself. Starting with the premise that "planning, of whatever character . . . is useless unless it influences action," he advocated the creation of a planning agency more closely integrated into governmental administration. He saw planning as a staff function directly under the chief executive. His major conclusions were that the independent, unpaid citizen planning commission could not adequately carry on the planning function, that this function should be attached to the executive office, and that planning agencies themselves must have a full-time executive head.

But while Walker's ideas were accepted by many professionals, the local governmental capability did not seem conducive to this type of organization. As a result, planning agencies continued to be set up in the traditional manner with a primary concern for physical development.

In the early 1940s planning also came under indirect attack in Frederick Hayek's book *The Road to Serfdom*. While Hayek actually defined planning as central direction of all economic activity and argued that socialism and economic democracy were not compatible, opponents of the idea of a rational solution to problems used this book to support their opposition to all planning activity. One result was that planning professionals adopted a defensive posture. As Gross pointed out, the fear to use the word planning forced the use of such substitutes as program, coordination, and policy without any clear understanding of the terms or how they related to the planning process.

In spite of these problems, planning continued to find support in urban areas. Growth of metropolitan areas resulted in growth of metropolitan planning commissions. Again, the accepted approach was a citizen body dedicated to the preparation of physical plans. Questions on the role of the planning commission and its relation to democratic institutions and elected officials continued to be raised. Metropolitan agencies without power to zone as a means of achieving the plan made an effort to use what had long been considered an important but relatively unused power found in most enabling legislation; namely, the referral of project proposals to the planning commission for review and coordination with the plan.

Another development that was to have a lasting effect on planning related directly to the Tennessee Valley Authority program. In the middle and late 1930s, TVA began to demonstrate that an agency assigned specific regional development responsibilities, but with broad overall area interests, could in fact be a major force in regional development. Beginning in 1941, TVA recognized the need to coordinate the planning being carried on by states and localities with its own activities in the Tennessee Valley region. Using the state planning agencies then being encouraged by the National Resources Planning

Board, TVA made funds available to these agencies within the Tennessee Valley region to provide local planning assistance to communities affected by TVA reservoirs and its other activities. The number of planning agencies in the valley rose rapidly as a result and provided the much needed joint planning by TVA, states, and localities. This activity became the forerunner of a national program of local planning assistance.

A community planning prerequisite for housing loans had been included in the 1949 Housing Act. Since the housing program was nationwide, there still remained many communities without funds and technical staff to meet the planning requirement. Carl Feiss, appointed head of the newly organized Planning and Engineering Branch within the Housing and Home Finance Agency's Division of Slum Clearance, became interested in ways to expand community planning as a means of relating the housing programs to overall community development. He visited the directors of state planning agencies and reported on his visits to the Tennessee and Alabama agencies, which were already providing technical planning assistance to communities with funds provided by TVA. His recommendations for federal funding of community planning became Section 701 of the Housing Act of 1954.

The 701 program provided federal matching grants for preparation of community plans. It helped solve the major problem facing most planning agencies, namely, the lack of funds to employ staff to do the necessary professional work required for plan preparation. Almost every city of any size and many counties organized planning agencies to qualify for a planning grant. The 701 funds also created great demand for people trained in city and regional planning. Planning schools grew in number, and their graduates provided for the first time a solid base of professionals to carry on the work in the field.

One other major development during this period deserves special mention. With the demise of the National Resources Planning Board in 1943, state planning agencies found it increasingly difficult to support and justify budgets. As Robert Walker had noted in relation to city planning agencies, state planning agencies also had failed to establish themselves as part of state management and administration. In looking for ways to support budgets, many state planning agencies turned to industrial development or to local planning assistance. As a result, few agencies remained with broad overall state planning programs.

As the 1950s came to a close, there was increasing concern, not only among professional people, but throughout the country, for improved administration of planning programs. Reports by the Council of State Governments and American Institute of Planners called for the organization of state planning as a staff function in the office of the governor and a broadening of its interests to encompass all concerns of state government itself. Similar ideas developed in metropolitan planning, where concern was expressed that metropolitan agencies did not relate to responsible elected officials. A period of intensive reassessment of the planning function began.

REAPPRAISAL, 1960 TO THE PRESENT

A first indication of the changes that were to occur in planning came within the profession itself. Perry Norton, in a report to the Board of Governors of the American Institute of Planners titled "Planning and the AIP," pointed out that many techniques of the planner were being challenged, including the master plan concept. He called for added stress on "the idea of planning as a process rather than a product . . ." as a means of broadening the field to include those professionals concerned with planning specialties and to meet the new demands of the expanded administrative and technical capabilities of government. These concerns brought a new emphasis on a systematic study of the planning process itself as Harvey Perloff had suggested in the early 1950s.

While city planning became firmly established in the 1940s and 1950s and, increasingly, the technical planner worked as staff within the overall governmental structure, the 1960s brought new emphasis on the need for areawide planning. The proliferation of planning requirements in federal legislation gave new impetus to the search for a comprehensive approach to planning. The financial support that a growing number of individual federal programs gave to planning brought about recognition of the need for a mechanism to coordinate planning activities and to provide a common base for areawide planning. Although regional planning became an accepted philosophy for most federal programs, each of these programs tended to set up its own local planning organization.

Governors and mayors expressed concern about the lack of coordination and the differing planning requirements among federal programs. Support grew for a single set of regions to which all federal programs could relate. The result was the issuance of Circular A-80 by the Office of Management and Budget, which called on all federal agencies to support a single set of planning regions to be established by the governor in each state. About the same time, Section 701 was amended to provide for planning grants to councils of local governments. This development was part of the long-standing search for ways to legitimize area and regional planning by establishing ties to elected officials. The theory was to have area planning agencies controlled by councils of elected governmental officials. This provided the necessary tie to the electorate and to the responsible public agencies.

A parallel movement also began in state government. Beginning in the 1960s, state planning was generally accepted as a staff function within the executive department. Today, most state planning agencies have broadened their activities to help develop policies and strategies for statewide development programs. This contrasts with the earlier emphasis on surveys and physical development.

A major force now shaping planning theory and practice is OMB's Circular A-95, which provides for notification and review of most programs for which federal grants are now available and for most direct federal programs that have a significant effect on area development. Under this process, a state-designated clearinghouse provides a vehicle for coordinating development proposals with all state agencies, and regional clearinghouses, usually the state-designated regional agencies, provide the mechanism for review and coordination at regional and local levels. These are important new concepts because they strengthen the referral and review procedure, which, although included in most of early planning enabling legislation, was not mandatory.

Which way are we heading, and where do we go from here? Present-day concerns for the environment raise many of the same issues that the conservation movement did at the turn of the century. The divergence of views on wise use as opposed to preservation of natural resources are central to present environmental concerns. And it is becoming increasingly clear that in the absence of a planning base, decisions as to environmental requirements in specific areas cannot be determined in a rational manner.

In part this is also reflected in the growing concern with the lack of land use and settlement policies in the United States. Bills considered but not passed by the last Congress would emphasize land use policy and the consideration of overall development policies for both urban and nonurban areas. The Rural Development Act of 1972 will have an important effect on future planning, but will require shifts in ideas about the use and development of rural areas. For example, the planning of public facilities in rural areas should take into account the kinds of settlement patterns that these facilities are designed to support. If water systems merely result in the extension of low-density sprawl into rural communities, the benefits of rural living will probably be lost. This calls for a fresh look at the whole settlement pattern in the United States and how it relates to the provision of services and opportunities for differing life-styles.

Finally, concepts of regional planning will probably require a complete reassessment if this kind of areawide planning is to achieve its expectations. Regional planning activities today are being carried out with machinery and concepts that were tried in the 1930s and 1940s and proved ineffective. Experience to date does not show significant local financial support or efforts to clarify the role of regional agencies. If federal funds were withdrawn, the agencies would probably wither away, as similar agencies did when the National Resources Planning Board was abolished. What we are coming to understand is that regions established on the basis of economic relationships do not assure a capability for effective planning and action. Fortunately, recent experiments, such as the one now being carried out in the Twin Cities (Minnesota) area, are opening new approaches. The Twin Cities Council is responsible for specific jobs that have been identified as essential for sound regional development. The council is having the effect of strengthening local government while providing essential regionwide planning and service facilities. Other experiments that may help answer some of these problems are the New York State Urban Development Corporation and the Maryland Waste Disposal Program. These experiments suggest that some of the problems we are now trying to solve on an inter-local basis might well be handled by state agencies.

All these efforts demand that as we continue to reappraise the planning function at all levels of government we develop a capacity to make our ideas and the problems to which they relate as specific as possible. General terms and lack of specificity in planning requirements are not likely to result in major advances in planning theory and practice.

THE LEGAL AND GOVERNMENTAL FRAMEWORK FOR PLANNING

[By Philip P. Green, Jr.[*]]

The legal and governmental framework for planning is essentially no different from the legal and governmental framework for any other function of federal, state, or local government. In a broad sense, planning is management for improved decisionmaking. In this sense, every agency at every level of government may plan with few legal constraints. Only when planning is used in the special sense of guiding land use and development do certain features of this framework become important constraints.

In the broad sense, planning consists of gathering and analyzing facts, both existing and projected; determinating needs and objectives; developing plans and programs to meet and achieve those needs and objectives; and carrying out those plans and programs in an efficient, coordinated manner. The first three stages are distinctive of the planning approach—the action or plan-effectuation stage involves the same activities that an agency would otherwise engage in.

In the more special sense of planning—as a device for guiding the use and development of land—the same is partially true. The difference is that many activities that were previously used independently, with little consideration for their interrelations, are now directed toward common objectives, and some new legal devices have been specially created for use by the planning organization in this effort. Thus, the planning organization (broadly conceived) taxes, spends, builds, regulates, and acquires, uses, and disposes of land. In the process it uses all major governmental powers—taxation, eminent domain, and police power. And in this use it is subject to certain legal constraints.

GOVERNMENTAL FRAMEWORK

Under our constitutional scheme that divides powers among the three levels of government, states possess the broadest range of planning powers relating to land use and development. They have elected to delegate most of these powers to local units of government, although some rethinking of this policy is currently underway. The Federal Government's impact on land use and development has been largely indirect, but nevertheless substantial.

Federal Government

In legal theory the United States Constitution is one of "grant" so far as the Federal Government is concerned: The Federal Government must be able to point to a specific constitutional authorization for whatever it does. Apparently the only provision that authorizes it to regulate directly land use and development of nonfederal property (and then only in a limited way) is the interstate commerce clause. This is the basis for federal regulation of the use of navigable waters, for example, and would be the basis for federal-strip-mining regulation. While the Federal Government can regulate emissions from industrial plants, it cannot constitutionally forbid the burning of leaves (as can the states).

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The major mechanism through which the Federal Government affects land use and development is its ability to levy taxes and spend them for the "general welfare." This enables the Federal Government to acquire land for such purposes as parks and wilderness. It authorizes the construction of public projects, such as the interstate highway system, which may have profound effects on development. It permits financial assistance to state and local governments to strengthen particular programs, such as construction of sewer and water facilities low-rent public housing, or urban renewal. It allows the conditioning of loans and grants to governments (e.g., A–95 review, "workable program") and individuals (e.g., Federal Housing Administration and Veterans Administration mortgage insurance) on their taking specified actions. It allows the positive or negative influencing of particular kinds of development through benefits and penalities written into tax laws.

The Federal Government also performs an important educational function in calling problems and possible solutions to the attention of state and local governments and the people at large. Whether done through study commissions, committees of Congress, spokesman for the executive branch, or agencies, such as the National Resources Planning Board of the 1940s and its predecessors, the impact of such efforts has been tremendous.

Probably the major thrust of current federal efforts, apart from environmental protection measures, is to bring about stronger planning programs at the state level.

State governments

Whereas the Federal Government enjoys only those powers granted to it by the Constitution, most state governments possess virtually all governmental powers not denied them by provisions of state or federal constitutions. Although they have exercised some of these powers in efforts to shape physical development, states have traditionally delegated most responsibility for this function to their local governments. Only recently have they started reassuming a greater portion of this responsibility.

One problem that must be solved as states take more responsibility for planning is an organizational one. Sparked by the need for public works planning during the depression, virtually every state created a state planning board in the mid-1930s. When this immediate need diminished, however, most such agencies either were permitted to die or became industrial development agencies, apart from a temporary surge of postwar planning activity in the closing years of World War II.

The Federal Housing Act of 1954, however, required a state planning agency through which planning assistance funds could be channeled to local governments. This brought about a resurgence of such agencies that has continued and expanded to the present. It is these agencies that presumably will be the focal point of a state's land use planning activities.

While many states earlier developed functional plans of one type or another, such as highway plans, state park plans, or medical care plans, they have only recently attempted to devise comprehensive state land use and policies. Hawaii is still in the forefront of this movement as a result of its Land Use Law enacted in 1961.

With the possibility of a National Land Use Policy Act before them and this experience behind them, plus new public awareness of environmental problems, many states have begun to experiment with direct state regulation of land use and development—particularly in areas of "critical state concern," either because of environmental or scenic characteristics, the need to protect public investments, or the need to preserve particular resources. Thus, development in and around coastal areas, mountain areas, state parks, public buildings or institutions, swamplands, inland lakes, and major highways has been subjected to direct state controls—either in the form of general laws or rules and regulations promulgated and administered by a state agency. Some states have limited such controls to very large developments or those that might produce exceptional impacts on the environment.

Other states have taken a middle course between direct state regulations and regulations promulgated and administered solely by cities and counties. They have either created or encouraged the creation of regional planning agencies with regulatory responsibilities. Although the ultimate organizational pattern has not yet emerged, it seems likely that land use planning and regulation will eventually involve a combination of state, regional, and local planning agencies—with the "lower level" units having progressively greater responsibility for refining and making more specific the policies and plans adopted by the units with broader geographical responsibilities.

Another form of emerging state activity is the adoption of state policies either as amendments to enabling acts under which local units operate or in separate enactments, with provision for these policies to override local policies and regulations. An example is a Massachusetts act under which local zoning ordinances and other regulations having the effect of excluding low-income housing may be overridden by action of a State Housing Appeals Committee.

In the case of certain environmental measures, such as stream sanitation, air pollution control, and controls over strip mining, states have not infrequently preempted the entire field of regulation, using state departments and agencies rather than local units to formulate and enforce necessary regulations.

Local governments

Even though state governments are experimenting with new approaches, the major responsibility for planning and regulating the use and development of land remains with local units of government—primarily cities and counties, although some special-purpose units, such as sanitary districts, have been granted limited regulatory powers.

These units, in legal terms, are creatures of state legislatures. Except in states where constitutions provide for home rule charters prepared locally and adopted by a vote of the people in a given unit, local governments are organized in accordance with enactments of state legislatures. They possess only those powers the legislatures have explicitly or implicitly granted them. The statutes under which this [illegible] done may be mandatory or permissive (enabling acts), and their application may be statewide, classified, or peculiar to a single unit of government (local or special acts). Collectively, they may be known as a "charter," although the term is sometimes reserved for circumstances where a single special act contains most of the statutory provisions relating to a given unit.

Historically, planning of land use and development was begun by cities, which still possess the greatest range of statutory powers to carry on such programs. Because problems tended to spread beyond city boundaries, however, legislatures reacted first by extending the planning powers of cities for distances of from one to ten miles beyond those boundaries and then by granting counties similar powers over other unincorporated areas.

Elements of planning organizations

Almost all local planning organizations, whether at the city or county level, make use of at least four organizational elements. The first of these is a *governing board* (city council or board of county commissioners). This board generally is responsible for creating the other elements of the planning organization, financing them, and furnishing housing and supportive services. After plans have been prepared, it usually is responsible for appropriating funds for public projects and adopting the various regulations required to carry out the plans.

The second element is normally a *planning board* or *commission*. Such a board or commission is required by planning enabling acts in most states, although its utility has sometimes been questioned. The planning board is composed of appointed citizen members, usually unpaid. It has general responsibility for seeing that studies are made, plans are prepared, and recommended ordinances, policies, and administrative procedures for carrying out plans are devised. In some states it has authority to adopt subdivision regulations (but usually not any other form of legislation). In most states it approves subdivision plats and makes recommendations to the governing board concerning proposed zoning amendments and urban renewal projects. It may also be called on to make recommendations on the capital improvements program, proposed annexations, proposed public projects, and other matters of interest to the governing board.

The third element is some type of *planning staff*. This staff is needed to perform two services: the nonprofessional leg-work of data collection and the professional analysis of this data and preparation of plans, ordinances, etc. In larger cities and counties this staff may be full-time, usually hired by and responsible to the manager or other local executive. In smaller cities the professional staff may be hired on a part-time consultant basis, possibly through a contract with a state planning agency, and supplemented by the nonprofessional services of other employees of the unit.

The final element is a congeries of *plan-effectuation agencies* that may be required to administer various devices for carrying out the plan.

This might include a committee to prepare and administer the capital improvements program; an inspection department to enforce the building code, plumbing code, electric code, housing code, zoning ordinance, etc.; a board of appeals or board of adjustment to hear appeals from the inspector with respect to zoning and other regulations; officials from interested departments who may be involved in administering subdivision regulations; an urban renewal commission with staff; an economic development commission with staff; and miscellaneous departments and agencies of the local unit. The local governing body itself may handle certain administrative functions, such as approving subdivision plats or granting special use permits under the zoning ordinance.

Some larger cities and counties in the past decade have consolidated some of these agencies in a Department of Urban Development. These consolidations typically include divisions performing the functions otherwise associated with the planning board, urban renewal commission, and housing authority, and their respective staffs, the inspection department, and possibly the engineering department.

Planning tools

The key to a successful local planning program is usually the ability of this organization to use a great range of devices in a coordinated manner to assure a desired pattern of development.

In the first place, publication of the plan itself may induce or influence a certain amount of private development.

Secondly, the local unit can encourage or discourage particular types of development in certain areas by providing or denying specific kinds of installations in those areas. Interstate highway system interchanges commonly become focal points for commercial development. A sanitary landfill, garbage dump, incinerator, or lighted football stadium may discourage nearby residential development while attracting other development. A golf course, park, or school may attract residential development. Depending on soil conditions, the availability or nonavailability of a public water supply or public sewerage system at a given location may have profound effects on development. A local government that recognizes these facts and skillfully uses its ability to locate such facilities can take much of the pressure off its regulatory mechanisms.

Third, by its acquisition of open space (whether parks, airports, cemeteries, or simply "development rights"), the local unit can influence the pattern of development and perhaps ease the harsh interrelations between certain types of development.

Fourth, through subdivision regulations the local unit can assure that whatever development takes place has an appropriate quality of design, that lots are of adequate size and orientation, that they are well drained, that the street system is safe, that adequate utilities are available, that suitable open space is reserved, and that, in general, a desirable living environment is provided for lot purchasers.

Fifth, through zoning the unit can control the overall pattern of development and interrelations among land uses. It can control the nature and intensity of development in each area so that properly scaled public facilities can be provided. It can insure once again that lots are of adequate size and buildings are properly located on the land.

Sixth, through building codes, electric codes, plumbing codes, minimum housing codes, etc., the unit can assure that new construction is sound, safe, healthful, and includes appropriate facilities.

Seventh, through other regulatory powers the local unit can keep floodplains free of development, prevent nusiance conditions from arising, forbid nappropriate location of hazardous operations such as explosives manufacture or storage, control air pollution or excessive noise or radiation dangers, regulate various types of businesses, protect and preserve historic areas, control the excesses of outdoor advertising, and, to some degree, control the appearance of structures in selected areas.

Finally, the local unit can attack mistakes of the past by improving services, providing new public facilities, eliminating isolated nuisances endangering people or property values, and enacting areawide programs for rehabilitating deteriorated structures, acquiring and clearing property prior to its disposition for new development, and other measures that generically come under the heading of "urban renewal."

Not infrequently, the major hindrance to effective planning is the failure of local officials to recognize these and other available tools and use them effectively.

THE LEGAL FRAMEWORK

All units of government—federal, state, and local—must carry on their planning programs in accordance with their statutory authorities and within the constraints imposed by state and federal constitutions.

In general, governmental powers fall into the three major classifications of taxing and spending power, power of eminent domain, and police power. Each type of power is subject to certain restrictions.

Taxing and spending

Many states may spend money only for "public purposes." While a broad range of matters fall under this heading, the constitutional restriction still prevents certain types of expenditures that might primarily benefit individuals. A related restriction is a prohibition in many constitutions of the grant of special privileges or emoluments to individuals or a prohibition of the grant of a monopoly to individuals.

A major hindrance to planners who would like to use the power of taxation to help shape development is a common constitutional requirement that taxes be "uniform." Other constitutional provisions may sharply limit tax exemptions.

Still other constitutional restraints may require a vote of the people before certain expenditues can be made or taxes levied. Constitutions may also impose relative or absolute limits on the amounts of taxes that can be levied. Related to these are many constitutional and statutory restrictions on the ability of local units to incur debt.

Eminent domain

The power of eminent domain aids planning programs by permitting the acquisition of property for particular projects, such as streets and school sites, or by serving as an essential ingredient to an urban renewal program involving acquisition and clearance of land.

Courts have imposed two requirements of a constitutional nature on the exercise of this power in addition to a requirement that the condemning unit have adequate statutory authority to take the property for the desired purpose. First, the purpose for which the property is taken must constitute a "public use." Secondly, the property owner must be adequately compensated.

Considerable litigation has dealt with the question of exactly what constitutes "public use" (a doctrine closely akin to the "public purpose" doctrine governing expenditures). It clearly includes property taken for use by the government (such as a city hall). It includes property taken for use by the public generally (streets, parks). It includes property taken for public utilities (power, water, gas, railroads. It normally includes the taking of "blighted" or slum areas to eliminate substandard conditions. But it may or may not include the acquisition of property rights for the preservation of open space or the acquisition of land for indeterminate future purposes (the "land bank" concept).

Police power

When governments exercise their regulatory powers (labeled collectively the "police power"), three major constitutional provisions serve as limitations. They are the "due process" clause of the Fifth and Fourteenth Amendments to the Federal Constitution and similar provisions of state constitutions; the "equal protection" clause of the Fourteenth Amendment and related state constitutional requirements; and the constitutional vesting of all legislative power in the Congress or in state legislatures, which is the basis of a doctrine prohibiting undue delegation of legislative authority.

The primary rule courts have imposed under the "due process" doctrine is that all regulations must reasonably and substantially relate to the public health, safety, morals, and general welfare. Thus, front-yard requirements in a zoning ordinance might be sustained on the basis that they conduce to public health by removing residences from the noise, dust, odor, and carbon monoxide of street traffic; that they conduce to safety both in terms of traffic safety (preventing children from ducking out of the front door directly into the street and preventing corner buildings from blocking the view of intersecting traffic) and in terms of fire safety (providing a fire break between buildings); perhaps that they conduce to morality by providing a degree of privacy; and that they conduce to the general welfare by restricting the density of development to a level that can be served by existing street, water, and sewerage systems. (Not all of these ties must be shown in a single case to demonstrate constitutionality.)

The major area where the tie to police power objectives is currently in question is that of aesthetic regulations (those that attempt to control appearance). The traditional view in almost every state has been that aesthetic objectives alone do not sustain regulations so that some tie to traditional objectives (usually safety) is necessary. However, increasing numbers of courts are finding that such regulations conduce directly to the general welfare or that they serve to preserve property values, which means preservation of the local property tax base, and this conduces to the general welfare.

Most state courts would now sustain restrictions on billboards and requirements that junkyards be screened. Many have sustained regulations of architectural appearance in historic districts or in the vicinity of public buildings, such as a state capitol. Some have upheld regulations aimed at what might amount to "visual nuisances," such as a prohibition of clotheslines in front yards, a requirement that utility wires be placed underground, or a requirement that trailers of various types be stored in garages or back yards. But whether architecture can be controlled in ordinary situations is still an active legal issue.

A second major "due process" test is whether regulations are "reasonable" or whether they go beyond what is reasonably necessary to accomplish a valid objective. If a particular regulation goes too far, in the eyes of the court, it will be held to be a "taking" and constitutionally invalid as an exercise of the police power (although in that event it might be treated as an exercise of eminent domain and upheld if the property owner is compensated).

One particularly important aspect of this rule is that courts generally require that the zoning of a particular piece of land allow the owner a range of alternative feasible uses of that land. This has in recent years invalidated many regulations aimed at preserving swamps, marshlands, and other rural areas against development. In one case, floodplain restrictions were invalidated in their application to a particular property even though they permitted parks, playgrounds, marinas, boat houses, landings and docks, club houses, wildlife sanctuaries, farming, truck and nursery gardening, and accessory motor vehicle parking—the court finding that none of these uses were "practical" in the circumstances.

In effect, courts seem to be saying that if a government wishes to preserve particular areas against development it must acquire and pay for them, or at least acquire "development rights" so the owner receives some compensation from society for this restricted use of his property.

A third aspect of "due process" is that regulations must be reasonably specific and not so vague that persons being regulated, enforcement officers, and courts lack a clear indication of what precisely is permitted and prohibited. This rule is based both on the "chilling" effect of vague regulations, which leave the cautious citizen so in doubt that he forgoes permitted conduct, and on the possibility of discriminatory application by enforcement officers (which moves into the "equal protection" area).

The "equal protection" restraint prohibits the grant of special privileges or emoluments of monopolies to favored individuals. This is coupled with a general feeling that fair play demands uniformity of treatment for all who are situated alike, which some courts find to be an essential ingredient of "due process."

This poses a real difficulty in the case of zoning, which operates on the basic principle that land in one area is regulated differently than land in another area. To find that zoning is not a violation of "equal protection," courts insist that the basis of the classification be reasonable.

A common line of cases involving this issue bears the label of "spot zoning." There have been many attempts to define spot zoning, none very successful. At base, it is simply the arbitrary and capricious treatment of certain property in a manner different from neighboring property. Spot zoning can occur either in the original zoning ordinance or as an amendment to that ordinance. The latter is more common, and many court cases have invalidated zoning amendments because they amounted to spot zoning.

But the "equal protection" doctrine is not limited to instances in which similar properties are zoned differently. It also involves different treatment of similar types of uses. For example, an emerging legal issue in many states is whether mobile homes can be zoned differently from modular homes, prefabricated homes, or conventionally built homes. Another example is whether public schools can be zoned differently from private schools.

And finally, there is growing legal attention to whether particular regulations discriminate against particular groups in our society. For example, it has long been clear that zoning cannot permit a church of one denomination in a neighborhood while barring others. Now there is a rapidly growing list of cases in which courts are examining land use regulations to determine if they are aimed at particular racial groups or low-income people. Courts have invalidated some zoning ordinances on the basis that they unreasonably restricted multifamily developments (such as apartments) so as to preclude adequate housing for low-income families. The exclusion of mobile homes may be attacked on the same basis.

The third major constitutional restraint on police power regulations—the prohibition of undue delegation of legislative authority—has lost most of its punch at the federal level but is still viable in many states. Succinctly stated, it means that a regulation cannot delegate to an administrative officer or agency the ability to grant or withhold permits or take other enforcement actions without written standards adequate to prevent arbitrary decisions. This obviously relates both to "due process" and "equal protection" by inhibiting the possibility of arbitrary and discriminatory treatment on the part of enforcement officials.

CONCLUSION

This, then, is the governmental and legal framework within which planning takes place. Obviously, the framework is in a state of flux in terms of both the governmental and legal aspects. Final details are uncertain. But again, planning is no different from other functions of government in this respect.

THE POLITICS OF PLANNING

[By Walter J. Monasch*]

If planning is so great, why do politicians keep rejecting planners' recommendations? This same question can appropriately be stated in other ways. One might be to ask not what the politics of planning are, but how planners can do an effective job of planning within a particular political system. Another one, which is probably more basic, is how can planners do any planning at all outside the political system if they accept the basic function of planning as the application of rational forethought to the shaping of physical structures, namely those of our communities.

Traditionally, professionals in most fields, including planning, have felt that they can engage in their activities and make their contributions to society apart from, or at least outside of, the political realm. Someone else—generally someone held in less esteem—is involved in politics and 'professionals" are above that sort of thing.

This syndrome no doubt is caused by the traditional American attitude that we can only elect persons who are absolutely pure and true, but the minute we elect them we obviously cannot trust them so we set up endless mechanisms to assure that they cannot get the better of us. That this paranoic fear all too often prevents an efficient governmental mechanism only adds to the public's paranoia about its government. It clearly proves that governmental officials (elected and/or appointed) are not to be trusted and are inefficient as well. A governmental delivery system, whether for welfare or planning, is suspect if it is too efficient and obviously incompetent if it is not efficient enough.

Current concern for environmental quality as opposed to economic growth has spawned excellent examples of such political contradictions. If a planning agency does what it is expected to do, namely, provide for reasonable growth projections and physical and social delivery systems of utilities, roads, and other public and private facilities, then that agency is accused of assisting the self-fulfilling prophecy of growth by providing for it. However, if that agency only develops programs for these components after the need is clearly demonstrated by a clientele group, then that same agency is accused of not planning ahead and providing for the needs as they are liable to arise.

If these contradictions appear to indicate that planning is a politically difficult process within our system, then one must accept that as being true, although it is probably no more difficult than many other activities within our relatively imperfect, albeit, surprisingly successful system.

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PLANNING COMMISSION MECHANISM

The political paranoia I mentioned has led to a number of interesting structural and organizational techniques that have given many writers food for extensive discourse. One of these is the planning commission mechanism. In simple terms, our representative government provides for the election of a representative legislative body—city council, board of aldermen, board of supervisors, state legislature. Associated with these are various administrative or executive organizations. In cities, for example, there are city managers and their staff or strong mayors and their staff. Planning hopefully is a key element in all of these. As an added factor, most legislatures have provided for planning commissions. Depending on the enabling legislation, the planning commissions have advisory and/or regulatory responsibilities and, in some instances, even legislative roles to play.

I believe there was a partial motivating undercurrent to the establishment of these commissions. Since (a) politicians (elected legislators) are potentially corrupt, and (b) technicians are prejudiced by their own specialties, it was necessary to establish a review and often control mechanism of hopefully uninvolved and independent (seeming honest and sincere) lay persons.

This arrangement in many instances enables both the politician and the technician to avoid their basic responsibilities. The politician is able to hide behind the opinions and recommendations of the advisory commission if it is politically advisable for him to do so. He can uphold the planning commission on the basis that it is the planning commission and thereby avoiding taking full responsibility for his own actions. Or he can overrule the planning commission on the premise that it is only an advisory body and he, as an elected official, must accept full responsibility.

The professional, on the other hand, is able to use the planning commission as an obstacle standing between himself and the legislators, thereby serving as a convenient whipping boy if his professional recommendations are not adhered to.

I am somewhat ambivalent about the role of planning commissions. Since legislative bodies appoint planning commissions, they can appoint commissions that accurately reflect their own orientation. If this is the case, then no countervailing or balancing force is available. However, if commissions are appointed with substantially varying orientations from those of the appointing bodies, then ongoing conflicts between the two units can and often do exist. Such conflicts almost inevitably lead to a breakdown of effective communication. In the long-term, negative results in the pattern of community development often occur.

PLANNER-POLITICIAN RELATIONS

Apart from the potential difficulty of relations between the legislative body and planning commission, there is the planning professional's relation to the community's political leadership. Existence of the planning commission as an interloper often creates a substantial distance between the planning professional and the legislative body, resulting in equally substantial distances between professional recommendations and the final political responsibilities involved. This often makes it possible for planners to devise recommendations that do not allow for judicious, positive, and necessary political compromise to be built into the original recommendation network.

Since the politician must compromise to develop reasonable consensus for direction, he is forced to make these compromises without having the opportunity to reevaluate understandable recommendations from the planning professional. He must shift for himself. Consequently, the planning professional is able to blame the politician for not making the most-judicious choice. This then leads to unnecessary and fruitless confrontations between the political leadership and planning professionals that simply aggravate the situation without producing any effective results. As a result, many planning exercises are highly intellectual and satisfying for the planning professional, but for the community they all too often turn out to be highly irrelevant.

There is a major dictum in politics that states: "You have to be elected before you can be effective." For planning, this dictum can be amended to read: "In planning you have to provide plans and planning on which politicians can be elected before you as a planner can be effective."

Planning depends on the planner convincing the public and its representatives—the politicians—of the wisdom and advisability of his recommendations. Any professional planner who cannot or will not recognize this democratic fact of life, may satisfy inner personal needs of making the "right" recommendations at all times, but he will almost leave behind a heritage of aggravated personal relationships and unsatisfied community groups and meetings.

Making this fact of life even more difficult is the problem a planning professional has in defining the nature of his client. In local government, planners are often hired by a variety of employers. The employer might be the local executive, the legislative body, or the planning commission itself. Planners must be loyal to any one or all three of these, even when they are in direct conflict. An additional conflict created by these loyalties to specific employers is the planner's responsibility to "the people" or "the public." (This is a particularly thorny problem when there are questions as to whether politicians do in fact represent the public.)

Even when it is clear to whom the planner is responsible within the local governmental structure, the planner has a partially undefined responsibility to the broader "public good." This potential conflict produced the current concern about advocacy planning in its many ramifications. Diffusion of responsibility presents potential and significant difficulties in developing an efficient, responsive planning program, and current realities of ever broadening public participation further aggravate this already extensive difficulty. As desirable, indeed, as essential as broader public participation is, it almost inevitably contradicts the desire for efficiency that is required of government to provide sufficient, quick, and responsive service in whatever activities it is responsible for.

Any plan that must respond to the concerns of people in a particular area at a time when these concerns are perceived will be difficult to sell and implement if it must undergo the current requirement of extensive and long-lasting citizen exposure and consensus.

Timing and exposure only complicate an already inherent and difficult relation since there is a basic timeframe difference within which planner and politician must work. A planner by the very nature of his responsibilities, training, and experience must look primarily at the long-term implications of any recommended action. On the contrary, the politician must be elected and reelected to be an effective politician. His prime awareness deals with the short-term results of any plan and the short-term implementability of that plan.

The planner, in practice, must learn to plan so he is able to build a long-term investment in the community and a long-term involvement of the politician and the community in its own future. At the same time, he must provide the politician and his community with short-term payoff opportunities that make it possible for the politician to be reelected.

There are no doubt many idealistic and courageous politicians who will support a planner's long-range program even though it may not provide any immediate practical and political payout. But unless such politicians (and I use that word in its most positive context) can also show current and on-going results, such as spinoffs on specific projects or solutions to current problems, those politicians may not be reelected. At such time, a planner must reeducate a whole new set of politicians. This task, which is time consuming and often difficult, must be weighted against all the other tasks facing the planner and his day-to-day activities.

PLANNING REALISTICALLY

Throughout much of planning history, planners have been accused of "dreaming the impossible dream." One cannot and certainly should not advise planners to stop dreaming, but if there is to be any successful planning in our political system, planners should be advised to sing that impossible dream to a politically possible and catchy tune. Only then will it be possible to combine the realities of political life with the creative stimulus of professional input.

PLANNING PRACTICE AND TECHNIQUES

[By William A. Malone*]

Planning is nothing more than thoughtful public guidance of change in a city or region, yet it embraces an extensive responsibility, governmental involvement, and continuing attention to all kinds of activities in the planning jurisdiction.

Whether comprehensive planning is being done for the first time in an area or whether an existing plan is being revised and updated, the same information is dealt with, similar procedures are involved, and the more or less formal concluding stages are completed in much the same way. History, geology, climate, and topography are types of information that provide a basis for planning. Fundamental subject areas that require detailed study are population, economy, and land use. Transportation facilities comprise a complicated system of space-using elements for moving people and goods. They must be studied in considerable detail. Physical elements of community facilities—buildings, open space utilities—all serve the needs of people and contribute to the quality of life, so existing facilities and future needs must be included in the planning study.

PLANNING TO PLAN

Organizing for planning and determining the area to be covered are closely linked. Answering questions regarding the "who" and "how" of planning also requires careful thought at an early stage.

Getting necessary studies and planning done involves either of two types of technical staff: Local staff employed by the planning agency of the governmental unit involved or a planning consulting firm working under contract with the planning agency. "In-house" planning may simplify administration if the planning staff is large enough to allow the pursuit of master planning with minimum interruption. If staff is small or nonexistent, a consulting firm may be the only means for conducting studies and planning in a reasonable amount of time, since a consultant's commitment involves little or no day-to-day service on current problems.

GETTING STARTED

A planner to begin with must become familiar with his planning area.

Maps of the planning area

To facilitate this review as well as the procedures to follow—requires a system of planning area maps. For purposes of gathering and analyzing information, the planning area should include the central urban concentration (city or cluster of cities) plus a sufficient area to accommodate anticipated future growth. When a smaller portion of a metropolitan area or region is being dealt with, it is still important to study thoroughly the interrelations between and among neighboring governmental units in developing the comprehensive plan. Inclusion of entire areas of minor civil subdivisions is usually necessary to use the information published for such units on population and other subjects. Whole counties or part of counties, but including entire units of the next smaller subdivisions (towns, townships, or boroughs), provide sufficiently large territory to show the planning area.

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Maps should be specific to the area involved and show all official boundaries. Adequate maps are sometimes available, but in many cases they must be prepared. A one-sheet wall map of the planning area is desirable, with a scale of 1 inch to 500 feet or 1,000 feet. Larger scale maps—for more detailed information at 200, 100, or 50 feet to the inch—on sheets for flat files or plat books are useful for both field and office work.

Background studies

A planner must understand why and how development has occurred in the planning jurisdiction. Notes on significant achievements in the past illuminate probable directions for the future. Topography, geology, climate, soils, and other physiographic characteristics of undeveloped portions of the planning area help determine the suitability of lands for future development.

Goals and early schemes

Having some familiarity with the planning area, the planner must determine clear-cut goals with the help of community officials and residents. At an early stage, generalized schemes with two or three alternatives can be drawn up. Such forward-looking schemes should reflect established goals and serve as overall guides to more detailed studies of the planning area.

MAKING DETAILED STUDIES

Basic studies on which most of the planning process builds are population, economy, land use, transportation, and community facilities. Research, inventory, and analysis in these subject areas demand a major portion of the planner's time. The quality of results determines to a great extent how effective the plan will be.

Population

A detailed population study deserves the attention of a demographer. On the other hand, a planner must learn to develop and apply his skills in many aspects of population analysis, estimation, and projection. In most local governments it is the responsibility of the planner to provide population information.

Population is analyzed for patterns of change; characteristics are studied in all subordinate groupings. Changes in growth rate are determined by reviewing decennial census figures. Ways of making population estimates should be devised for the period between decennial censuses. Changes affected by births and deaths (natural increase) are modified by movement of people (net migration in or out). Population projections are based on recent population changes.

The planner is not expected to be clairvoyant in estimating future population. Long-range projections, if allowed to stand, can be wide of the mark—over or under—in a decade or two. Continuing awareness of factors affecting population and periodic updating are necessary to reduce the divergence between projections and actual development. Overlapping and interrelated information from economic studies, employment, land use, and transportation is a necessary factor in ascertaining population changes. Governmental policy itself also has an important bearing on population changes.

Economy

Economic studies generally include as much detail as possible on activities in production, marketing, wholesale, retail, commercial and professional services, government, finance, employment, land, and property values. If minutely detailed or elaborately extensive studies are needed, consulting economists can be contracted for. Some larger planning consulting firms offer this service also. However, local planners can collect data from published sources of information, augmented by local sources and inventory and survey procedures as appropriate.

Information regarding family or household income, labor force, and related data are useful in studying an area's economy. Employment trends for the larger industries or larger segments of commercial and industrial activities are fundamental to growth and change in population.

Economic concerns are intimately involved in community goal-setting. Many governmental policies develop around economic considerations.

Several techniques have been developed for analyzing an area's economy. The economic base technique is most frequently employed in studying urban economy. Others, more regionally oriented, are the input-output method and income-product accounts (or social accounts) method. These three techniques are treated in considerable detail by Chapin in *Urban Land Use Planning* and by Andrews in *Principles and Practice of Urban Planning*. Other respected techniques discussed by these two authors are approximation analysis by Chapin and industrial complex analysis and mathematical models by Andrews. All the methods have limitations, but all have some usefulness in planning. Whatever technique is selected should be applied carefully.

Land use

Land use inventory and analysis involves a field check of each parcel of land in the planning area and all uses made of the land, both with and without structures. Assembled information is recorded for office reference on maps suitable for showing each parcel and each use, on cards, or on tape. In many urban areas, computer storage of these data is becoming commonplace, and much planning information can advantageously be included in such systems. In smaller urban areas, hand-recording land use on maps and tabulating accumulated quantities may still be satisfactory.

Uses are classified—a necessarily complicated procedure because of the many parcels of land and use variations. Quantities are tabulated according to area and numbers of units in each classification.

All land within a planning jurisdiction is accounted for—with structures, without structures, vacant streets, railroads, open space for recreation, agriculture, and so on. Accumulated areas are calculated in various uses under the classification system and should add up to the total area of the planning jurisdiction. Developed area is shown as a percentage of total area. Figures in each use classification are tabulated and shown as percentages of developed area. Information on land values is important for the planning of future land development patterns.

Numbers of dwelling units or housing units provide a useful reference for development densities in residential areas and for estimating population. Knowledge of housing development locations may be useful also in drawing population "spot maps," which indicate a somewhat generalized distribution of inhabitants.

Simplified notes on the condition of structures may be recorded with the land use information. Areas containing large proportions of deteriorating or dilapidated housing serve to indicate possible urban renewal projects. The same indicators reveal serious problems in commercial areas. When extensive blight exists, simplified notes on structural condition will not be reliable. More precise and comprehensive survey techniques will be needed. Probably the best known and most reliable is the American Public Health Association's appraisal method for use in residential areas.

Land use and zoning

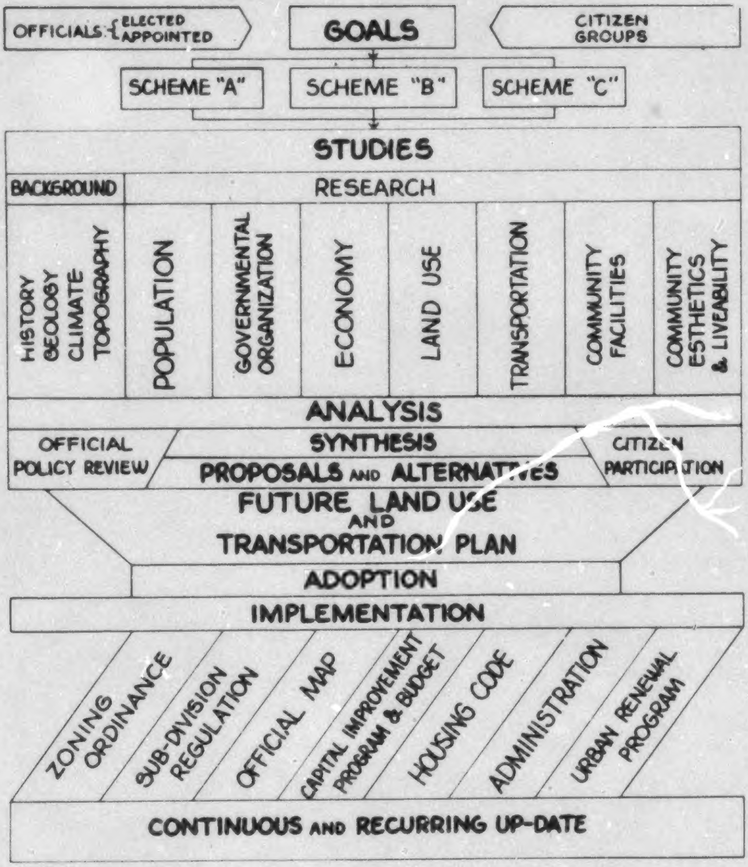
Land use patterns and detailed relations serve as a basis for preparation of zoning regulations. The zoning ordinance map must initially reflect existing conditions or uses of land—not necessarily to recognize and/or approve of these uses, as located, indefinitely. Regulatory provisions must be based on existing conditions to be reasonable. Established land use patterns readily reveal harmonious groupings and areas of conflict between or among uses. So the zoning district classifications as written in the ordinance and shown on the zoning map should reflect established experience of what works well together and should encourage similar uses for continued compatibility as further development occurs.

Once the zoning ordinance becomes law, subsequent changes proposed and applied for will be studied first by referring to harmonious land use relations both on maps and in the field.

Transportation-circulation

Study of a transportation system encompasses all aspects of moving people and goods into, out of, and within the planning area. Streets, highways, railroads, airports, and waterways are the major facilities required. Vehicles of all kinds, terminals for handling people and goods, and pedestrian rights-of-way are also objects of study.

Information on existing facilities, activities, and problems is assembled and analyzed. If new facilities are proposed, such as highway or street extensions, it should be recognized that improved accessibility will influence traffic as well as development. Major streets,



The planning process

highways, railroads, and streams also serve as dividing elements in a community, so the spacing and alignment of these major physical features must be carefully directed.

Standards for planning streets and highways are usually derived from engineering experience in handling and regulating traffic and in methods of construction. Yet many details of street system planning are the responsibility of planners, so extensive cooperation and coordination between engineers and planners is necessary to create a functional system.

Much quality in subdivision design depends on street arrangement—shaping blocks for homes and spaces for neighborhood service facilities. Classes of subdivision streets vary, ranging from major thoroughfares to minor local streets. Appropriately, many local governments include details of street design and construction standards in their subdivision regulation ordinance. Sidewalk standards may be included as well.

Public transit—using large-volume vehicles to move people on regularly established schedules and routes—has encountered many difficulties, primarily economic, in most urban areas. Public subsidies have been necessary in many cases, and the Federal Government has sponsored research and experimentation to find possible solutions to the economic and other problems associated with such transit systems. The planner must recognize that age groups comprising the labor force are least affected by transit system difficulties, but to school-age children and senior citizens public transit is critically important if they are to enjoy mobility within an urban area.

The planner must also realize that rapid transit systems serve large numbers of commuters in major metropolises on radial routes. These systems operate in their own rights-of-way over longer distances. Recently, in several rapidly growing metropolitan areas, new systems have been undergoing construction and existing systems expanded.

Inter-city passenger service by airlines and by bus is also studied. Airports for different classes of service are considered. Railroad yards and terminals are studied for possible combination, relocation, and extension of lines for service to industry. Truck terminals and transfer facilities are included in planning studies. Port facilities and connections to other elements of the transportation system complete the picture.

Transportation elements, utilities, and official policies on extension of utilities are also important factors affecting urban and suburban patterns of development.

Community facilities

Facilities that serve an area's entire population must be studied. These include both areas and structures, public and semipublic. Examples are schools, parks, churches, municipal buildings, libraries, utilities, drainage and waste disposal, and transportation elements.

Basically, planning should balance the needs of people against the resources available to provide required facilities and continuing services.

Benefits of economy and efficiency accrue to a community when more than one use can be made of land, buildings, and/or equipment. Joint acquisition, development, and use of school sites and playground-parks by school districts and municipalities are familiar examples of this kind of local cooperation.

Planners integrate location considerations with space requirements and relate appropriate distribution of facilities to the developed areas of the city they are designed to serve: residential, commercial, or industrial. Specific site selection and acquisition is most often left up to the responsible agency: governing body or operating board, commission, or department. Development and operation of the facility follows in the same line of responsibility.

FINALIZING THE PLAN

As inventory and analytical procedures progress, ideas are generated for synthesizing the information into planning proposals. Policy review is requisite to this phase since goals and policies must guide planning. Plans drawn should aim to achieve goals within the framework of policies.

Preliminary or intermediate planning ideas are presented to appropriate officials, members of agencies involved, and citizen groups to get their reactions before proceeding with more detailed planning. If the individuals contacted sufficiently represent people in the community, then support for additional planning proposals may be assured. However, citizen participation and solicitation of broad-based support must be a continuing activity in the planning process.

In a plan, projections of future growth and change take several forms: population and employment projections, future land use plan, economic projections, extension and expansion of the transportation system, and public facilities (community facilities) plan. Within any level of estimated growth (there may be alternatives, for example, low, medium, and high growth), alternative patterns of development should be considered. Continued expansion of existing patterns of development may propagate problems inherent in past development. Studies of how to eliminate or prevent such problems may lead to alternate ways of guiding and controlling development. Extensive application of acceptable standards can provide the basis for quality in multitudes of details as planning proposals are specified and effectuating devices are enacted.

IMPLEMENTING THE PLAN

Planning is never complete until measures for plan effectuation are drawn, enacted, and administered. Common plan-effectuation devices include the zoning ordinance, subdivision regulations, official map, capital improvement program, housing code, urban renewal procedures and projects, and administration of services to keep a community's physical plant and activities working.

Zoning ordinance

Zoning derives from the police power granted by states to local governments. Generally, the zoning ordinance controls, by district, the use, height, and bulk of buildings; uses of land; and density of population.

Subdivision regulations

Planners are responsible for checking subdivision plats for compliance with requirements set out in subdivision regulations. While these regulations overlap to some extent with zoning regulations, they go on to fix the financial responsibility for completion of improvements within the platted area. In many states, local planning commissions approve plats. In other states, city councils retain this responsibility, but plats are referred to planning commissions for study and recommendation before approval.

Official map

The official map grows directly from those portions of a plan dealing with transportation systems and community facilities. It is an instrument of plan effectuation indicating proposed major street extensions and, in many instances, other public facilities and open spaces. Also, it is precisely dimensioned by engineering determination and supported by legal descriptions. When officially adopted and duly recorded, it prevents construction of buildings or other development in the spaces designated and so reserves these spaces for public acquisition and development.

Necessarily tied in with the capital improvement program, the official map may reasonably show only those spaces to be acquired with public funds as financial resources become available.

Capital improvement program

To accomplish the public's share of community development as set out in the plan, a program for financing land acquisition and development of facilities is needed. This capital improvement program is a schedule of designated items, listed by priority and estimated cost, that a local unit of government plans to acquire and construct over a specific period of time. Usually five years of detailed allocations of funds are proposed beyond the immediate budget year. The program is controlled by anticipated revenues from appropriate sources.

Continuation of planning

Through continuing application and interpretation as well as periodic updating and revision, a plan is kept current and workable. And a community comes to realize as much of its plan as possible.

IMPLEMENTING THE PRODUCTS OF COMPREHENSIVE PLANNING: THE PUEBLO EXPERIENCE

[By Allan Blomquist*]

For five years the Pueblo Regional Planning Commission followed the Department of Housing and Urban Development 701 planning book and drew a comprehensive plan. This article is about the seven years after the plan. The approach is not necessarily accepted by planners as a group, but it illustrates a point most planners would make: planning must be tailored to the local situation and change as times change.

DEFINING "COMPREHENSIVE"

A "project" plan is one plan, say for a specific school or drainage way. It is usually done by an architect or engineer to guide budgeted construction.

A "functional" plan is 100 to 1,000 project plans, say for a school system or drainage system. It is usually done by an operating agency to guide its five-year capital programing and budgeting effort.

A "comprehensive" plan is 10 to 20 functional plans or 10,000 to 20,000 project plans because it includes all project plans, plus functional plans, plus the intangibles of goals, civic strategies, priority settings, probabilities, conjectures, trade-offs, deferrals, intrigue, budgeting, and so on. It is usually done by a "planning" agency as a 20-year guide for the areawide policy-making unit of government.

I have never seen a real comprehensive plan. What I have seen, experienced, and believe in is comprehensive planning: a process that sometimes uses map and plan drawings to articulate a proposal or idea.

Since most state enabling statutes and federal programs require a comprehensive plan, most agencies create and adopt one. However, effective agencies energize a process that produces other products: research, facts, proposals, ideas, suggestions, and help that altogether facilitate public decision-making. The plan is only a handy document. It is always done and therefore not current.

For years planners regarded more powers of implementation as something they needed to do their jobs better. Today, most would agree that implementation should be in the hands of elected officials, public managers, or the private sector—that leadership element called the "civil community."[1]

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Rule 1

Comprehensive planners use their comprehensive plan and overall program designs to guide a continuous flow of internally consistent policy options, plan alternatives, fact production, citizen involvement, action proposals, opportunity suggestions, and just plain questions and ideas that relate to a philosophically and goal-based "sense of direction." This sense of direction must have general or specific support in the civil community that guides decision-making in the physical region being planned.

NOT IN THE BOOK

One reason for a modicum of local success in being a partner to the consensus process in the Pueblo civil community is a 10-year-old concept for the office production of helpful things as useful increments for the incremental clientele. Each is an office "routine" that fits into an overall system of interlocking routines that help implement the comprehensive planning process.

First, research is forced onto 8½- by 11-inch sheets of paper in a data bank with one numbered and indexed sheet per informational item in a form anyone can use. There are now 3,000 such sheets in the bank. We sell about 2,000 copies a year to market researchers and give away another 1,000 copies to staff, other agencies, and officials. This is functional citizen contact at its best. If people want our facts, they normally have something on their mind, and they often tell us or ask us about it. In this way we get to know what is going on in the way of public research and private feasibility studies.

Second, maps are available to the public through a local blue printer at normal print cost. On the basis of who buys what, we can often tell what to expect soon in the way of a zoning case or developmental proposal.

Third, newspaper coverage averages 2,000 column inches a year, meetings and outside appointments average 500 a year, three telephone lines are busy, and drop-in visitors average five or more a day.

Fourth, our office has no zoning administration and avoids other operational responsibilities. We restrict our activities to research, informational services, planning, and ideas. As a result, we are not saddled with scar tissue from zoning and other operational disputes that rub off negatively on planning efforts.

Fifth, we provide an ombudsman service to those who ask for help in wading through a particular problem with any governmental agency. On occasion we advise both sides in the same zoning dispute how best to present their side of the case. We do not take sides, but simply suggest who to see or what to do.

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[1] Daniel Elazar in his book *Cities of the Prairie* (Basic Books, Inc.) defines "civil community" as "a species of locality . . . containing many governmental institutions not necessarily coterminous with city boundaries of metropolitan limits, but served by a single comprehensive local political system." "A local political system," Elazar says, "can be identified as the organized sum of the political institutions which function in a given locality to provide it with the bundle of governmental services and activities that can be manipulated locally to serve local needs in light of local values." With respect to politics, Elazar writes, "While it (the civil community) has too many people for communitywide face-to-face relationships, it is still small enough to afford all who are so inclined the opportunity to develop such relationships with the circle (or circles) of actors who shape the community affairs. In practice, this means that no member of the community is more than one person removed from the local decision-makers."

Sixth, A-95 (a project notification and review system initiated by the Federal Office of Management and Budget) and other reviews are done routinely, and some 95 percent have been for projects on which we "helped" in one way or another at some time during the conceptual or gestation periods.

Seventh, we have stopped calling our proposals plans and now put them out as idea sketches without the pomp and circumstance normally associated with recommending a plan. We suggest. Our commission or those most affected or elected recommend.

Eighth, we help produce a monthly magazine about the community that contains a mix of cultural calendar, local articles of interest, and planning articles. On television our people interview community officials and citizens on matters both directly and indirectly related to our prime planning concerns. The use of both media is low key, which helps prevent premature issue development.

Ninth, we use an impartial convener to chair ad hoc meetings on pending idea sketches. Normally, we invite a mix of 15 persons who are directly affected, send them a rough draft ahead of time, and the convener asks each to make his or her observations at the beginning of the meeting. Points are then listed and discussed in order, with the planner allowed to speak only as a resource. Thus, when finally proposed, the ideas are neither new nor jolting, and they are based on early citizen input.

Tenth, we have no dead files. Each August and December we "thin" our files to make room for the accumulation in the next six months. This practice tends to preserve the continuity of the important and interrupt the continuity of the less important.

Eleventh, staff members are encouraged to take special courses and become involved in a variety of work and civic experiences, the net result of which is improved personal ability and respect for the interdisciplinary and team aspects of planning and decision-making.

Rule 2

Office procedures and mechanisms must be keyed to the planning process and not to the book on how to manufacture a plan. Production of a plan is a sub-system. The larger office system involves fitting planning into local consensus development and local decision-making. The same holds for the HUD 701 rule book. It is a sub-system. The prime focus should be on needs as defined by the civil community.

DEFINING WHAT'S "GOOD"

In 1962 we faced the task of communicating with 500 farmers and 200 ranchers who were ill-disposed to listen to city-slicker professionals. The issue was rural zoning prepared by our professional staff. The farmers and ranchers endorsed it, and the county commissioners passed it in 1963. In 1958 these same farmers and ranchers gathered 5,000 signatures on a petition against zoning, which at that time had been prepared by well-meaning nonprofessionals.

The difference was simple. The nonprofessionals tried to convert a city ordinance to fit a rural situation. The staff and commission talked with the farmers and ranchers and invented what they needed—zoning to protect them from city-type nuisances. When the farmers and ranchers came to the meeting, they saw the result of their earlier input.

In June 1972 the county commissioners opened a $1.5 million Arts and Conference Center in downtown Pueblo. The project idea was articulated several years earlier when our staff was helping a loosely knit group of citizens form an arts council. The project required a five-year slow sell by an ever larger team of citizens led by two dedicated, persistent women.

Comparing the zoning functional plan story and arts center project plan story reveals three common denominators: genuine need, good sense, and persistent leadership. Resulting therefrom is expressed and dedicated citizen and political support for a technically sound and wanted plan. The result is action.

THE TEST OF TIME

Another common characteristic in both cases was the passage of five to eight years from the first articulation of the problem to implementation of the solution.

The test of good art supposedly is the test of time. So it is with project, functional, and comprehensive plans.

Early in my career as a planner in St. Paul, I was assigned the task of cleaning out the St. Paul Planning Board vault containing all kinds of dusty maps and files dating back to 1917. I looked at every one of at least 5,000 maps over the two-month clean-up.

An amazing number of those plans had been redrawn every five years or so. Sometimes different names were used for the same basic project. Almost always there was one or more meaningful design modifications. The original 1918 design for a St. Anthony parkway for carriages, for example, was finally built as a depressed freeway on the interstate system.

I left St. Paul and came to Pueblo in 1960, just in time to see 30 years of local effort result in congressional approval of the $200 million Fryingpan-Arkansas project. In June 1972 the contract for the Pueblo Dam portion of that project was finally let. It will have been 45 years from articulation of the original idea to completion of the project. Even more interesting is how what started as the Arkansas-White River project ended up as the Fryingpan-Arkansas project and how 11 hydro plants in 1960 will end up being one hydro plant in 1975.

The point is there is seldom such a thing as *a* plan. The plan is really a sequence of plans, each slightly modified by each succeeding planning team.

Implementation comes when the plan and time are right. The plan becomes right over time by being exposed. Time itself serves as the inevitable modifier and improver.

From conception, each plan that finds a receptive ovary has its own gestation period before experiencing birth—what planners call implementation and what plain folks call action.

Rule 3

Comprehensive planners must adopt an incrementalist approach and technology. They must effectively participate in functional and project planning and work at linking all three levels with a practical incremental-

ism that produces synergistic byproducts. The multiple-use productive powers of comprehensive planning improve functional and project plan mixes.

PLANNERS DON'T IMPLEMENT

Planners plan. Others implement. There is thus an interdependency called public decision-making, of which planning is just one part. The process depends on civic teamwork for success.

The comprehensive plan traditionally provides the locality with a persistence factor. It is supposed to be good enough to change only slowly, so it can in fact guide orderly growth and sensible development.

A good comprehensive, functional or project plan, properly distributed and exposed, will persist on its own merit. A half-good plan can later be made good by a planner's persistence in trying again to "get it right" after successive waves of criticism and help from others on the team, including affected politicians, managers, agency heads, technical experts, and citizens. A bad plan will be ditched quickly.

Persistence does not mean bullheadedness. It means willingness to change and revise when such results in bettering the product offered. The comprehensive plan and process that operates early enough for adequate gestation gives the team effort a persistence factor. If done right, it wipes out bullheadedness, elitism, pride of authorship, and other divisive factors that often negate a team effort.

Rule 4

Good comprehensive planning is a planning-legislative-management-citizen team working in an ongoing institutionalized format that assures the continuity and flexibility required to improve each plan element sufficiently so it can survive the test of time. Full and adequate gestation is a prerequisite for technical excellence and for consensus among affected clientele.

GIVE THEM WHAT THEY WANT

The Pueblo Regional Planning Commission does not buy the "give people what they want" key to political popularity. But we listen, and our agency spends money every two or three years to formally ask people what they want. In fact, our surveillance and monitoring of what they want is constant. We see our professional challenge as discerning between what they want as the symptom and the real cause, and the finding out how to correct or harness that causative factor.

For example, one symptom-only demand was for a teen center. Analysis really needed. The center itself, as originally desired, would probably have frozen or limited the variety of options the teens themselves really desired and needed.

The planner's method of handling this type of situation need not be a quick "yes" or "it won't work." A string of meetings could be a better alternative. This could start as a meeting of adults demanding a teen center, shift to inviting teens to participate, involve a survey of existing and desired activity options, and end up calling for a total communitywide recreation program to better coordinate and advertise existing options and to schedule new activities and facilities needed to fill the discovered voids.

THE COMPREHENSIVE APPROACH

Comprehensive planning has a special approach that is important to the "how" of implementation of its products.

An easy and often used explanation of this approach is to say simply that the methods and products of comprehensive planning are not unlike the methods and products of multiple-use planning as professed by the Bureau of Reclamation or the Corps of Engineers, but this is true only to a limited extent.

My best definition is first to identify the territorial imperative and then the temporal commitment to forever.

The territory or region being planned is seen as forever evolving and changing. Within those limits, the preconditions to a comprehensive plan or any portion of it are constantly changing, which causes any comprehensive plan drawn at any point in time as always needing revision to accommodate always recently changed conditions.

This is not true just of comprehensive city planning. It applies equally, if not more so, to rural America as well. Look at what Safeway packaging machines and the feedlot have done to cattle ranching. Look at what designation as wilderness has done to wilderness. Look at what helicopters have done to off-area skiing.

In addition to the territorial and temporal ingredients, comprehensive planning must also be comprehensive in the original sense of the word and be an institutionalized, ongoing team effort.

Rule 5

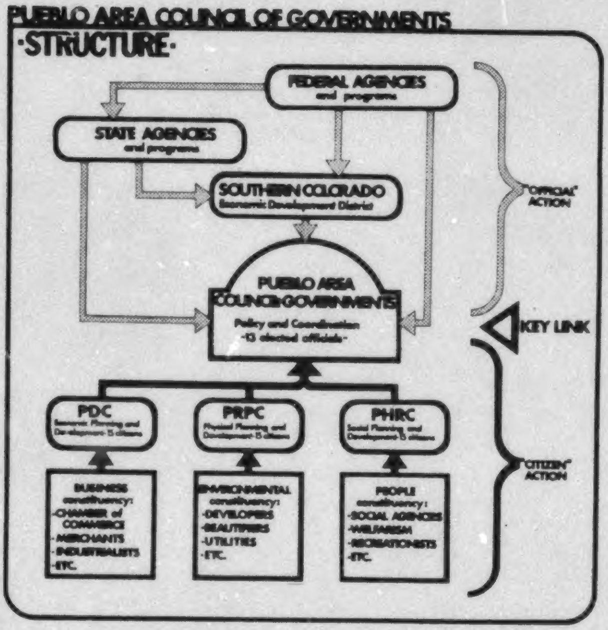
No matter how good an outside expert is, he cannot, by definition, do comprehensive planning because he does not comprise a locally representative planner-management-legislative-citizen team that lives on the territory being planned and that must look on any plan as a potential mistake to live with later if implemented.

IMPLEMENTATION

In one sense, comprehensive planning amounts to meddling in everybody's business all the time. It appears as a region's "conscience" that stays around to make sure what has been planned actually works after it has been implemented. It can profit from a mistake by remembering the pros and cons of when a plan was a plan and comparing them with the pros and cons after the plan became a fact.

How is it possible to both be a professional meddler and develop a record of getting things done, and at the same time serve as a region's conscience? Lots of planners point to their record by saying, "I did that stack of reports." Others point to the accomplishments of their community by saying, "We did this," or "They did that," or "Mayor Smith pulled that one off." The latter are involved in comprehensive planning that gets implemented.

Historically, comprehensive planning has been stuck off in a commission as far from decision-making as possible. Planning so located and controlled by a citizen commission was theoretically to avoid being dirtied by politics. By definition it became ineffective, except when planners learned to meddle well by worming their way into the political scene, closer to decision-making.


PUEBLO AREA COUNCIL OF GOVERNMENTS
·STRUCTURE·
FEDERAL AGENCIES and programs
STATE AGENCIES and programs
SOUTHERN COLORADO Economic Development District
PUEBLO AREA COUNCIL of GOVERNMENTS
Policy and Coordination
-13 elected officials-
"OFFICIAL" ACTION
KEY LINK
PDC
Economic Planning and Development 15 citizens
PRPC
Physical Planning and Development 15 citizens
PHRC
Social Planning and Development 15 citizens
BUSINESS constituency:
-CHAMBER of COMMERCE
- MERCHANTS
- INDUSTRIALISTS
-ETC.
ENVIRONMENTAL constituency:
-DEVELOPERS
-BEAUTIFIERS
-UTILITIES
-ETC.
PEOPLE constituency:
-SOCIAL AGENCIES
-WELFARISM
-RECREATIONISTS
-ETC.
"CITIZEN" ACTION

The structure of the Pueblo Area Council of Governments and its surrounding web of interrelationships is designed to assure involvement in local decision-making by all affected groups and individuals. The product is a partnership or team effort at the local level that should, in a year or two, produce more than surface unity of purpose and direction of achievement.

HUD finally institutionalized the trend set by these meddlers, first by suggesting and now by requiring that 701 planning funds go to regional councils of governments or cities and counties instead of to regional planning commissions. This one action did more to put regional comprehensive planning into the decision-making stream than any other thing. It said planning must be involved directly with elected officials, not indirectly.

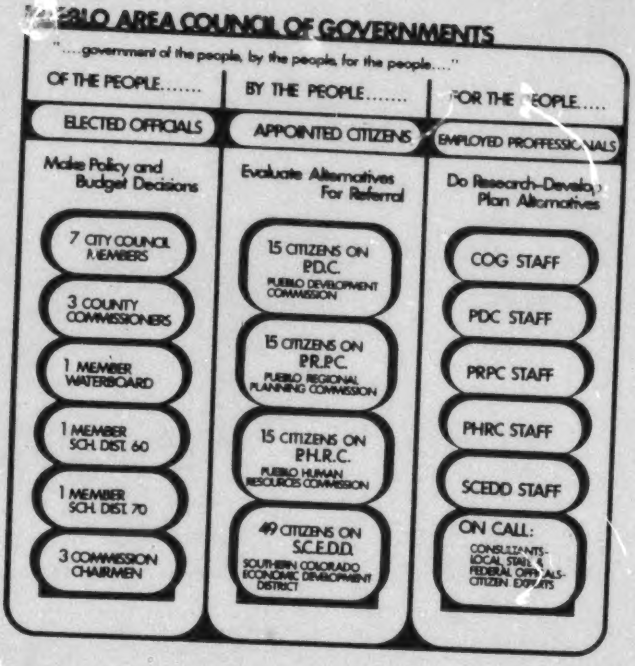
HOW TO IMPLEMENT

The *territorial imperative:* Every square inch of this nation must be in a comprehensive planning district. It is based on the age-old concept of stewardship of the land.

The *temporal imperative:* Every district must be permanent and funded as such. It says the steward of the land has to both be there and big enough to handle the job.

The *technical imperative:* Planning is a problem-solving, idea-creating business that requires a dedicated, interdisciplinary team.

The *administrative imperative:* Planners plan, the politicians decide, the administrators implement, and the taxpayers pay.



The partnership comprised of elected and appointed officials as well as staff people, is broadly based in numbers to reflect a variety of skills, concerns, and types of influence for input to the team's output.

The *citizen-participation imperative:* All of the above is suspect, except as a general rule, and subject to reinterpretation, redefinition, and appropriate rearticulation for each local situation.

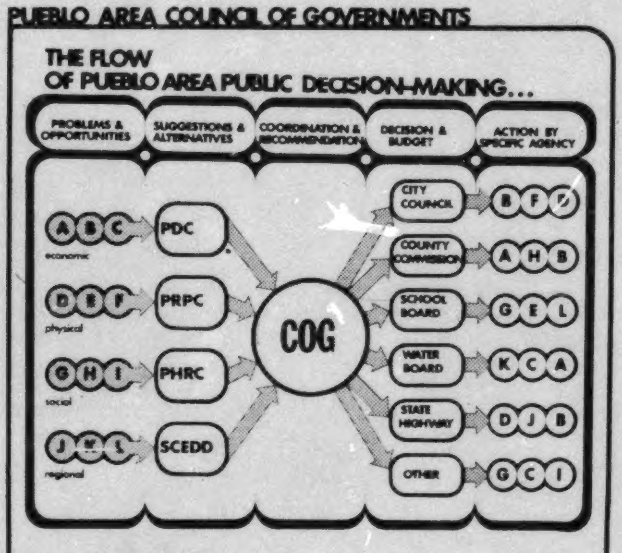
These imperatives are basic to the long-range "right" game plan. But for today and early tomorrow, there are other implementation factors to consider. For example, HUD recently changed its 701 planning program to the HUD 701 planning and management program. This step followed quickly the change from supporting citizen commissions to supporting agencies directly controlled by elected officials.

From these two moves, it is clear that HUD thinks of comprehensive planning as being concerned with policy. A rumored next step is pulling 701 out of HUD and moving it to OMB, alongside A–95. This step will presumably tie in well with whatever revenue-sharing programs pass the Congress. It is interesting that President Nixon already has succeeded in pushing decision-making on many categorical grants out to regional headquarters, and revenue sharing will carry that move the next step by giving states and localities a bigger slice of the decision-making responsibilities.

What this all means is that any comprehensive planning done today will only be in gestation when the currently evolving federal game plan becomes effective. Gone will be several traditional implementation avenues that often condition what gets into a plan and what gets budget priority. For example, the federal categorical grant to localities was the single most important implementation device of the last two decades. It was a carrot so good that most localities dropped many of their local priorities and accepted federal priorities instead.

When the revenue sharing allocation and some block grant-type criteria for the use of that allocation reach the local level, the proponents of highways and urban renewal will not be able to wave a 90 percent federal funding advantage for highways or a 66 percent advantage for urban renewal against a 50 percent advantage for sewers and open space or a no-funding advantage for swimming pools and art centers.

What is expected is that states and localities are in for some soul-searching, goal-oriented, priority-setting, and budget-making sessions that will tax the very viability and survival prospects of local government itself. In short, local decision-makers and their planners, managers, administrators, and citizens in each stage and locality may soon be asked to fully set their own priorities once again.



After planning and decision-making, an economic problem or opportunity, say "A", often ends up being implemented by specific actions of two or more action agencies. The same route is followed by physical problem "D," social opportunity "G," etc.

What that means is that goal-setting, planning, and decision-making must all be done in the context of the widest possible political consensus and in harmony if chaos is to be avoided in the local priority-setting and budgetary processes. Helping get such consensus jelled in the pre-decision stages is what the new comprehensive planning has to be all about.

Rule 6

Citizen-front committees and pretty plan and goal statements from consultants or academia tailored to appease federal requirements for a "comprehensive plan" and "citizen participation" must be abandoned as rubbage peculiar to the categorical grant era. They must be replaced by a genuine local heartfelt and knock-heads type of goal-setting and budgeting that includes the comprehensive planning function in it and not separate from it.

THE PRE-DECISION ROLE

Assuming the territory is defined and that inside the territory's governmental machinery there is an ongoing, interdisciplinary comprehensive planning process that is superior technically and politically, how does this process relate to equally superior functional planning and project planning housed in other departments and agencies?

Basically, the answer is found in the steps of the process, which can be diagramed in many ways. The following seven-step diagram is as good as most:

	Step	Stage
1.	Facts	Pre-decision comprehensive planning
2.	Analysis	
3.	Ideas and alternatives	
4.	Pre-budget hassle and decision.	Mid-point functional planning and programing
5.	Budgets	Post-decision project planning
6.	Plans and programs	
7.	Action	

Whenever a functional plan is done for highways, for example, the decision already has been made to try to spend on the implementation of the resulting project plans. The gut purpose of the functional plan is to allow pre-final programing and budgeting to make sure the job can be done. In contrast, comprehensive planning has to do with whether a decision to do something is worth making.

Rule 7

Comprehensive planning helps articulate regional or community needs and opportunities and the best directions toward solutions and actions. It operates in the pre-decision sphere and has nothing to do with actual implementation, except that early articulation is helpful in moving the other partners in the local decision process along the path toward implementation.

PARTNERSHIP

It is no small task to produce hundreds of plans, proposals, ideas, and alternatives over a several-year period that, altogether, are internally consistent in the sense implied by comprehensive planning so that 10 years later one can look back and see how when each was added to the other the city or region actually began to be a better city or region.

As local conditions and opportunities changed over the years in Pueblo, so did our planning response to them. Our whole program was oriented to fill the voids we discovered in various community efforts.

At one point, about the eighth year, a hostile councilman hurt our budget request seriously when he asked, "What have you done—really?" Caught by surprise, we could not answer and began to wonder ourselves. Later it came to us as our defenders came out of the woodwork to save our program. They reminded us of strategic help given on this and that at timely moments.

Then we looked back on our eight years: the three successive versions of a one-page comprehensive plan and the series of reports, memos, policy suggestions, casual conversions, data to researchers, television shows, newspaper clippings, speeches, meetings, hearing testimony, and the like. We discovered certain threads of continuity and internal consistency with lots of things lots of folks were thinking about, asking about, and talking about all those years.

The patterns were fascinating. We had done nothing by ourselves. We had really only nudged those things on the plan ahead of those that were not.

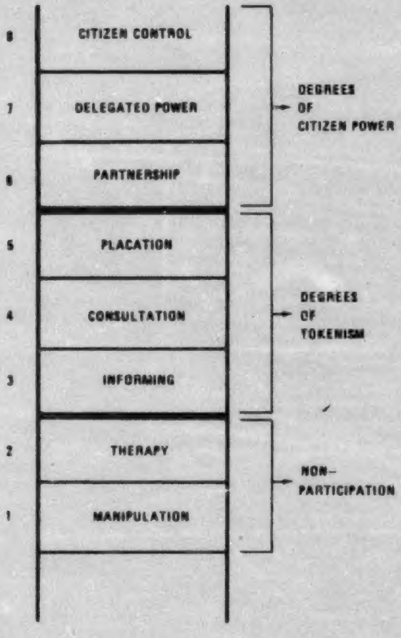
Partnership consists of nudging to get agreement instead of fighting to get dissolution. Nudging consists of dealing with people one to one, finding out what they really want and think, giving in on this, standing firm for that, waiting for the right time, waiting for understanding and support to develop, trying a second or third time to draw better or describe better.

A regional planning agency's partners are the whole local population, local officials and agencies, outside investors, and State and Federal Governments. With each there is give and take.

The really important partner is the local one, consisting of elected officials, appointed citizens, agency administrators and technicians, and the general public; as a whole and in its small, individual constituencies that form about particular issues at particular times and places.

From meaningful anticipatory dialogue with them in the predecision stages do the best facts, analyses, plans, alternatives, ideas, and questions arise. This, in effect, allows time for gestation. People, if given time and help, can set the planning work program and the frame for the plan. What the comprehensive planner does is help them dive in early and articulate that program and the plan, or framework for a plan. He helps the community reach consensus on direction and relative priority earlier than usual.

At this point, you might scream. "Not practical!" A politician would say, "To be a leader, find out where they are going and run out front and yell 'follow me'!" But I am saying it somewhat differently. I am saying the planner must help the community articulate earlier what it wants and needs on all fronts and for all time.



Eight rungs on the ladder of citizen participation

Rule 8

Comprehensive planning will not succeed unless the civil community wants help.

IMPATIENCE

The above is oriented to long-range comprehensive planning, while the country seems to be falling apart over demands for project plans and *now* action accompanied by general impatience with the overall slowness of government.

The same *now* pressures exist in Pueblo, and the Pueblo area council is a response to them. Addition of the Pueblo Human Resources Commission to deal with social issues and creation of the area council flow mechanism from constituency to action are the first local strategies to become more responsive to this impatience.

Reading studies on citizen participation in the Office of Economic Opportunity, Model Cities, and other programs in bigger cities most involved with public impatience, and matching them with local knowledge, one senses that scale is a factor both in the severity of the problem and the possibilities for solution.

Technical committees and ad hoc project, minority, and neighborhood groups already gain entry with some ease, but many groups and interests have not yet become involved. This total involvement will evolve over the next few years.

The goal will be real involvement and participation. The diagram by Sherry Arnstein describing eight rungs on the ladder of citizen participation has meaning in this regard. State and local charters and laws place elected action entities, like the city council and the county commissioners, on rung eight—citizen control. The Pueblo area council structure itself sits on rung seven—delegated power. The entry system now evolving sits on rung six—partnership, and often involves rung four—consultation—and rung three—informing.

The basis for most impatience has not been comprehensive long-range planning per se. It is only that such planning under 701 was done and has been visible. The true basis for impatience is in the failure of functional agencies to have functional plans, the failure of implementation agencies to have enough money to budget, and the failure of project planners to draw project plans for which no implementation was probable. And much of the failure can be traced to general apathy in the civil community itself.

But long-range comprehensive planning under 701 has been guilty of highlighting the gap between what could or should happen and what did not or what is. To that extent it has helped spawn impatience.

The problem now is to beget better performance from the full governmental decision-making structure, of which comprehensive long-range planning is just one small part. With federal revenue sharing and other changes in state and local money raising and allocating mechanisms, dollar help is on its way. With both comprehensive long-range planners and functional agencies taking more of a management view by focusing on functional and project planning via new incrementalist mechanisms, technical help is on its way. With each election, each simplification of overlapping federal, state, and local mechanisms, and each increase in citizen involvement and participation, more help is coming from the civil community itself. And with each new management and technological change, more help on implementation arrives.

MANAGEMENT

Most people who have watched Pueblo for several years are impressed with the change. A once sleepy, depressed kind of place began to come alive in 1969 and 1970.

Planning has played a partial role in this renaissance. More important, however, was a phenomenon that began in the late sixties: "They've got more plans than we can ever use." "Their plans cost too much—aren't practical." "They don't need a budget increase." "If they did practical plans, we'd get more done."

This criticism was answered by a lot of people realizing that it was not the planning that was wrong, but rather the implementation. As the criticism reached a peak, a new city council and new city manager came on the scene and without fanfare implemented more talked about projects in one year than had been done in the previous five or ten. They had carefully gotten a key charter amendment passed and then moved swiftly to a comprehensive array of projects. The anti-planning balloon had burst.

Rule 9

If you don't have implementation, it is because you don't have implementers that want to implement and have the powers of implementation.

In describing the management function in this planning to implementation process, the Pueblo city manager talks about such things as "orchestration" and "doing our homework" and "extraneous variables" and "timing."

Rule 10

In local government the responsibility for the orchestration necessary to implement plans rests generally with the civil community and specifically with elected officials and the managers they hire to help them perform the tasks they elect to perform or have performed.

Rules 9 and 10 sometimes fly backward to modify rules 1 through 8. In this regard, the key observation is working from rather than working to a comprehensive plan. The full impact of this observation for comprehensive planning relates mostly to the concepts of process, incrementalism, flexibility, gestation, timing, trying to get it right, working with others, flow, teamwork, management, etc. In total, it all refers to local political realities like true facts, true problems, accurate analysis, and workable solutions.

INTEGRATING NATURAL RESOURCES INTO AREAWIDE AND LOCAL PLANNING: THE SOUTHEASTERN WISCONSIN EXPERIENCE

[By Harlan E. Clinkenbeard*]

Most planners have, through the years, been primarily involved in *urban* planning—that is to say other than rural planning. Traditionally, organized planning at the local level in this country has dealt for the most part with planning for urban communities, both large and small.

In many organized planning programs, however, no long-range plans have ever been prepared, no long-range community objectives have ever been discussed by the governing officials, and only the legal control of land use through zoning has resulted from such "planning." Until recent years, most plans prepared included land use plans that encompassed only urban uses: residential, retail, industrial, institutional, and perhaps recreational. Agricultural land, if recognized at all, was usually classified as "vacant" or "undeveloped" land. Lakes and streams were depicted on existing land use maps but usually ignored in the detailed analyses relating to plan development. In communities where urban uses predominated, land generally was not considered a natural resource that may have severe limitations for development. Rather it was viewed as a commodity to be exploited.

During the decade of the fifties, city dwellers began moving from the relatively high-density central cities to the relatively low-density suburbs. Suburban community leaders as well as central city leaders and their planners became concerned about this new "urban sprawl." Not only did it begin to tax the fiscal capabilities of recently rural communities to provide even basic services for their rapidly growing populations, but the physical capabilities of the natural resource base to sustain the development attendant to such growth as well. Those concerned began to view metropolitan areas as mixed rural-urban communities with many complex problems, some of which were not even considered in more traditional urban planning. Regional planning, as generally structured today, was and is a major outgrowth of this concern. The seven-county regional planning commission in southeastern Wisconsin was created in 1960 for the basic purpose of preparing sound plan recommendations to solve the complex problems of one rapidly developing rural-urban region.

AWARENESS OF THE RESOURCE BASE

From the beginning of an established staff program in 1961, the Southeastern Wisconsin Regional Planning Commission considered knowledge of the status and limitations of natural resources in the

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2,700-square-mile region as an important work element. In 1960 the region housed approximately 1.6 million people, and less than 20 percent of its land was devoted to urban uses. Two of the six initial commission planning studies during the 1961–63 period dealt with the natural resource base and utility systems of the region. The former involved compilation of work by a dozen agencies and included more than a dozen separate inventories and studies of various resource elements related to land, air, and water as well as wildlife habitat, vegetation, geology, and topography. The latter study inventoried the extent, quality, and quantity of public and private utilities in the region—all physical improvements that relate directly to the natural resource base. In addition to these initial inventories, the commission prepared base maps meeting national map accuracy standards for each of the seven counties in the region—the first such maps in the region. These first planning studies comprised the foundation for the framework of areawide plans to be prepared.

FORMATION OF AN ADVISORY COMMITTEE

The commission's first major work program in preparing comprehensive plan components for the region began in 1962 as the "transportation study." Until that time, most transportation studies in the United States had placed little emphasis on land use and the natural resource base. A technical advisory committee, formed by the commission to assist its staff in developing a prospectus for the proposed three and one-half year, $2 million transportation study, wisely included work elements dealing with land use and the natural resource base. The committee's thought was that no physical improvement as extensive as a regional transportation system should be planned without extensive knowledge of the impact of such facilities on land use and the natural resource base and vice versa.

Before beginning work on the land use-transportation study, as it was termed in 1963, the commission increased to 96 the number of members on the technical advisory committee. Representation included such professionals as county agricultural extension agents, public works directors, wildlife specialists, city planners, soil scientists, and economists—at least one representative from each discipline dealing directly with land use, transportation, or the natural resource base. Each individual picked was experienced in his particular vocation. The committee then divided itself into seven subcommittees dealing with the transportation, land use, and natural resource components of the overall study.

Committee members were informed at the beginning that they would be called on to review all facets of the individual inventories, analyses, and plan proposals presented by the commission's staff and its consultants. The advisory committee was not looked on as a body of technical talent formed only to review and rubber stamp the work of the staff, however. The committee was expected to provide input to the planning program. More importantly, it was to help interpret and use at the local level on a day-to-day basis the regional plans that would result from the overall study.

In some cases local, state, and federal agencies agreed to assign personnel temporarily to the study staff in order to provide direct input and gain first-hand knowledge of the regional land use and transportation plans being prepared. These preliminary efforts in selecting an advisory committee orientation were considered essential to plan implementation. They have been subsequently duplicated in the formation of every technical and citizen's advisory committee for each of the commission's major planning program work efforts.

ASSIGNING STUDY PRIORITIES

The land use-transportation study prospectus was necessarily brief in outlining those major work elements of the planning program dealing with land use and the natural resource base. An important first effort by the advisory committee and commission staff was to determine what specific studies or inventories should be conducted and to what depth and detail. In designing the first land use inventory ever to be conducted for the entire seven-county region, for example, urban planners on the committee requested a detailed inventory of retail and industrial uses. Agriculture-oriented members (rural planners) of the committee requested detailed inventories of agricultural land activities. Not all the detail could be accommodated within time and funding limits. However, this type of input and exchange of knowledge resulted in an initial inventory and subsequent reinventories of rural and urban land uses in southeastern Wisconsin that have become the backbone of every planning program undertaken by the commission to date.

Another major concern to the commission, its staff, and the advisory committee was the level of detail at which the results of various inventories and special studies would be tabulated, summarized, and/or presented. This issue was particularly important because of the need to orient the information to implementation programs carried on by the local units of government.

Rather than establish an artificial grid for geographic measurement and coding of information, the existing U.S. Public Land Survey quarter section (approximately 160 acres) was used as the unit for which all applicable data could be delineated, coded, measured, and mapped. The Public Land Survey provides a grid describing areas of approximately the same size that historically have been the basis for delineating, documenting, and transferring land parcels in this part of the United States. In addition, most man-made physical features in the region, such as streets and highways and many major utility lines, as well as property fence lines, coincide with section and quarter section lines.

Use of the quarter-section designation allows coding of data to a specific quarter section, section, township, and civil division within the region. Each quarter section has a unique numerical identification that can be combined manually or processed electronically to represent various civil divisions and counties and natural boundaries, such as divides between watersheds. This same system was used to delineate, code, and summarize data relating to the socioeconomic makeup of a neighborhood, community, or the region as a whole and the data relating to travel habits and patterns of persons residing in these same areas. SEWRPC envisioned that information summarized at the quarter section level could not only be used in its planning efforts, but by local, state, and federal agencies operating in the region on various projects.

IMPORTANCE OF SOILS INFORMATION

Funds limit most major planning programs. Studies or inventories to accumulate information that would be "nice" to have must necessarily be eliminated or cut back to conduct those specific studies or inventories considered essential to program objectives. Such was the case in the natural resource base studies conducted as part of the land use-transportation study.

Again the advisory committee provided substantial guidance to the commission and its staff. In a series of advisory committee meetings, decisions were made to direct a major portion of funds earmarked for natural resource base studies to a detailed "operational" soil survey. Soil Conservation Service and Extension Service representatives on the committee pointed out that most soils in the region had severe limitations for urban development that relied on on-site soil absorption sewage disposal systems (septic tanks), although "urban sprawl" using such systems was continuing almost unabated, far beyond the extent of public sanitary sewer facilities. It was also pointed out that only 42 percent of the region had been mapped by the Soil Conservation Service, and those soil surveys had been conducted primarily in rural areas on individual farms.

The detailed soil survey became a major study of the entire regional planning program, not only because of the importance of soils information to the land use development aspects of the plan, but because the information gained from such a survey would be of continuing value in plan implementation as well as in the preparation of other regional, subregional, and local plans.

In reaching formal agreement with the Soil Conservation Service, the commission placed particular emphasis on being able to quickly convert actual field survey maps to multiple reproduction form for immediate use in the regional planning programs as well as in local planning and plan implementation programs. Field mapping of soils was accomplished using the commission's aerial photographs obtained in the spring of 1963. Once the field mapping had been checked and inked on the six-square-mile field maps, screened (133-line) negatives at a scale of 1 inch to 2,000 feet were prepared for each field map. This enabled inexpensive diazo prints to be made for use by the staff and by local planners and the general public within weeks following field mapping. The map scale was selected to correspond with the scale of the commission's base maps.

In addition to soil survey maps, a major report, *Soils of Southeastern Wisconsin*, was published. This report described in detail each soil type in the region and included 16 interpretive tables for use with the field maps in almost every type of public or private program or project dealing with the land. The soils data, interpreted for urban and rural planning use, became a major element in determining what land was suitable for urban purposes—a major factor in shaping regional land use plan objectives and standards as well as subsequent regional plans. The soils data also became a major element in determining the location of prime agricultural land in the region in order that such land could be delineated and perhaps preserved from encroachment by urban development.

The commission, like most governmental planning bodies in this country, is an advisory agency with no powers to implement the plans it prepares and adopts. Implementation of the plan or plan components must be brought about by the various local, state, and federal units of government operating at the regional level and used as input to the various areawide plans must, therefore, be usable by these same units of government.

Subsequently, a planning guide for local governmental agencies was published that outlined the use of soils data in various planning and plan implementation programs. Since the detailed soil survey was conducted during the 1963 to 1966 period, soils data have been integrated into local land use plans, local zoning ordinances, local subdivision regulations, local building and housing codes, and local sanitary codes in southeastern Wisconsin—all actions that serve to implement directly the regional plan. In addition, private developers and investors have begun to use soils data in day-to-day private decisions, which also serve to implement the areawide plans that include these data. The detailed soil survey has indeed become a significant tool in combating "urban sprawl"—a direct contributor to both land and water pollution—in southeastern Wisconsin.

OTHER RESOURCE CONSIDERATIONS

Soils data alone cannot provide the basis for all decisions regarding land and land related resources in a given area, however. Any recommendations resulting from either the regional land use-transportation planning effort or other areawide plans and having to do with the land and water resources of the region must be based on a significant knowledge of the various elements of the resource base. The commission, its staff, and the advisory committee also determined that information on woodlands, wetlands, wildlife habitat, and the quality of major streams in the region should be a part of the initial land use-transportation study, realizing that future watershed and community planning efforts may have to address themselves more specifically to these resources. In addition, it was deemed essential that information on natural resource-related elements of the environment, including outdoor recreation and historic, scientific, and cultural sites and structures, be included in the initial inventory in order to form a basis for future recommendations regarding these important resource base elements as a part of any land use planning effort in the region.

In conjunction with the land use-transportation study, Wisconsin Conservation Department foresters, working under an agreement with the commission and using the commission's aerial photographs, delineated all major woodlands in the region and rated each in terms of its value for both aesthetic and commercial uses. The department also conducted special wildlife habitat studies, delineating on aerial photographs (scale of 1″=400′) the specific areas where various species of birds, mammals, and fish could be found as well as the relative quality of these resources. Both of these special studies helped determine and delineate future urban and urban-related development, such as major highways, and primary environmental corridors, which have been delineated in the regional land use plan and recommended for preservation by local, state, and federal units of government.

In addition, the commission staff, working with the State Historical Society and the seven county historical societies, inventoried those historical structures and cultural or scientific sites already having some official status and, consequently, marked for historic preservation as well as those structures and cultural and scientific sites known to exist but having no official status and, therefore, subject to potential destruction by future public and private development. This inventory also contributed to the delineation of the primary environmental corridors.

In addition to the inventory of existing outdoor recreation sites as part of the overall existing land use inventory, which included urban and rural land uses, potential outdoor recreation sites of those privately owned areas having, by local determination, some potential for future acquisition for outdoor recreation purposes were identified. More than 600 parcels of land were visited and evaluated for potential for outdoor recreation development and use by a landscape architect on loan to the commission staff from the State Conservation Department. Results of this inventory too were used in delineating the primary environmental corridors. They have also become the basis for many local and state acquisitions and development of outdoor recreation land in the region. Some of the best remaining natural areas having recreation potential were delineated in this survey and subsequently recommended for preservation for use by everyone living in or visiting southeastern Wisconsin.

Wetlands were also inventoried as part of the overall land use inventory. Each wetland area, like woodlands, wildlife habitat, and existing potential outdoor recreation areas, was delineated, measured, coded, and placed in electronic data processing form for use in all planning activities in southeastern Wisconsin dealing with land.

Major emphasis in the land use-transportation study was placed on water quality of streams in southeastern Wisconsin. In 1963 little was known about the quality or the impact of urban and rural land use development on the quality of water in the region's streams and lakes. The commission considered it important to the planning program to evaluate the impact of such development on water quality.

Clearly, any regional effort to collect and analyze information on water quality in southeastern Wisconsin would be a benchmark effort. There was but one continuous recording stream gauge on the region's 43 major streams in 1963.

State and federal health agency representatives on the advisory committee volunteered their agencies' services to assist the commission's staff in establishing 87 water quality sampling stations on these 43 streams. They also agreed to assist in metering water flow, water sampling, and the conduct of 25 separate analyses of the water samples taken at each station over a 14-month period. There data were correlated to land use activities along the streams and in the watersheds to evaluate the impact of these activities on water quality. Such information was used to prepare alternate land use plans as well as to evaluate plans in the process of reaching a final plan. Subsequently, comprehensive plans for the major watersheds in the region have used these data as a historical base in more detailed analyses.

Monitoring of streamflow and water quality at each of the 87 sampling stations is now carried on by the Department of Natural Resources (formerly State Conservation Department) for use by local, State, and Federal agencies as well as the commission.

CONCLUSIONS

Integrating natural resource base information into areawide and local planning and plans involves a series of actions that must be initiated at the time such programs are conceived. Due to national and even international concern for the environment in recent years, as well as new state and federal regulations that have been established in response to that concern, the task of setting aside funds in physical planning program budgets for special resource studies or inventories is more easily accomplished than once was the case. Once this initial step has been accomplished, the remaining actions directed at the establishment of resource information usable by all concerned must include:

1. Establishment of a committee or advisory body that is structured to allow an exchange of knowledge and ideas, while at the same time having representation from those local units of government, as well as citizen groups, that will ultimately implement the resulting plans.
2. Development of a program outline that sets forth the general types of data to be collected and the general uses to which the data will initially be oriented.
3. Selection of a uniform system for data delineation, measuring, coding, storage, and retrieval that is readily usable in the preparation of the plans and by all concerned with or affected by the plans.
4. A determination of the priority and level of depth and detail at which each resource element should be explored in order to be used by all concerned.
5. Development of a staff assistance program and published guides to assist local, state, and federal units of government to interpret areawide plans and incorporate resource data into day-to-day decisions and action programs.
6. Development of on-going programs to keep data current through continuous monitoring and or reinventory or analysis.

Subsequent areawide and local planning programs initiated by the planning commission have dealt with those resource elements not directly addressed in the initial programs during the early 1960s and with those resource elements that were addressed and required refinement to be more useful to both areawide planning programs and local programs for plan implementation. Planning by its very nature is the beginning and not the end. One specific plan cannot be envisioned as the only possible plan. Rather it must be evaluated against various alternatives to develop the best plan within existing constraints. Ultimately, planning must be a continuing process if it is to be useful at all.

WATERSHED MODELS: TOOLS IN PLANNING LAND MANAGEMENT FOR WATER AND POLLUTION CONTROL

[By C. B. England*]

Adequate consideration is seldom given to the fact that all phases of the hydrologic cycle are involved in the disposition of wastes on agricultural land. Infiltration, storage, movement of water in the soil, surface detention and runoff, evapotranspiration, groundwater recharge, and channel processes all influence the fate of any material applied to a soil. And these processes, in turn, are regulated by a multitude of soil, topographic, biologic, and climatic factors.

Agriculture's role is to manipulate these physical and biologic factors to control agronomic and hydrologic processes. Since water transports dissolved or suspended materials, the hydrologic aspects of waste disposal, as affected by land use and management, must be emphasized.

A wealth of practical information is available from the Agricultural Research Service and elsewhere on climatic factors affecting the occurrence and distribution of precipitation; on the role of soils and vegetation in infiltration, evapotranspiration, storage, and release of water; on geologic control of deeper flows; and on the movement of water overland or through channels and reservoirs. Often, such information has been obtained for, and applied to, specific geographic situations of climate, soils, land use, and physiography. These studies have supplied valuable basic information needed to solve pollution problems in the locality where the data were gathered. The need now is to integrate these research findings into comprehensive prediction methods having wider application.

WATERSHED MODELS

Because of the complex interdisciplinary nature of predicting watershed performance, comprehensive mathematical models have been developed in agricultural hydrology. These models are abstract, computerized devices for simulating the hydrologic processes that occur during the conversion of precipitation to streamflow. Their use in conjunction with available information on soils, land use, geology, and stream channel characteristics enables one to predict the spatial and temporal sequences in the hydrology of a watershed. The more comprehensive models incorporate the ability to assess the influence of land use changes and structural works on streamflow from a watershed when it is subjected to a rainstorm or series of precipitation events. Thus, mathematical models offer a tool for the design of agricultural practices and engineering structures that can effect desired changes in runoff and streamflow.

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To construct and operate a detailed mathematical watershed model, the modeler assembles appropriate formulas describing the physical processes of infiltration, storage, subsurface movement, evapotranspiration, and surface flows within or on the land. He then incorporates these into a computational framework that accepts, as input, measured or synthesized precipitation data and outputs runoff rates and volume, soil water, or streamflow data.

In generating the usual output of streamflow data, a comprehensive model will also compute the storages, paths, and rates of flow throughout a watershed. Because such models provide a method of keeping track of water movements, the quantities involved, their special distribution, and rates of flow, they offer a useful technique for tracing substances that may be dissolved or suspended in the water.

Hopefully, the models have the flexibility required to simulate hydrologic processes under the diversity of conditions over the nation. A distinct advantage of the model approach is that, through manipulation of parameters controlling the prediction computations, the model builder can quickly and efficiently evaluate potential effects of management alternatives, thereby optimizing the design of control measures to achieve a specified objective.

EFFECTS OF LAND USE

The water control planner has many options at his disposal. The agronomist and soil scientist have identified for him many soil and land use measures for controlling water on or in the land. The engineer has designed mechanical structures to complement these measures. In combination, they can provide means of accurately controlling the volume, rate, timing, and path of water flow at various points in the hydrologic continuum.

Good examples of results from research on combined land use-engineering methods come from ARS experimental watersheds, such as those near Treynor, Iowa. There, several watersheds, ranging from 75 to 389 acres, were planted to corn or bromegrass, and level bench terraces were constructed on some of the watersheds.

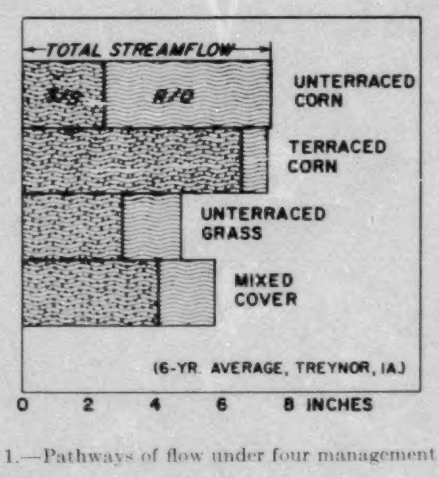


FIGURE 1.—Pathways of flow under four management systems.

Figure 1 shows the surface (R/O) and subsurface (S/S) components of total streamflow for the Treynor watersheds under four treatments. Total annual streamflow from the watersheds in corn was essentially the same (about 7.5 inches) whether terraces were present or not. But terraces did change the route by which water entered the stream. On the terraced watershed, only 0.8 inch of the 33.2 inches of annual precipitation traveled over the surface, while 6.6 inches took subsurface routes. On the unterraced watershed, most excess water became surface runoff (5.0 inches), leaving only 2.5 inches for return from infiltration.

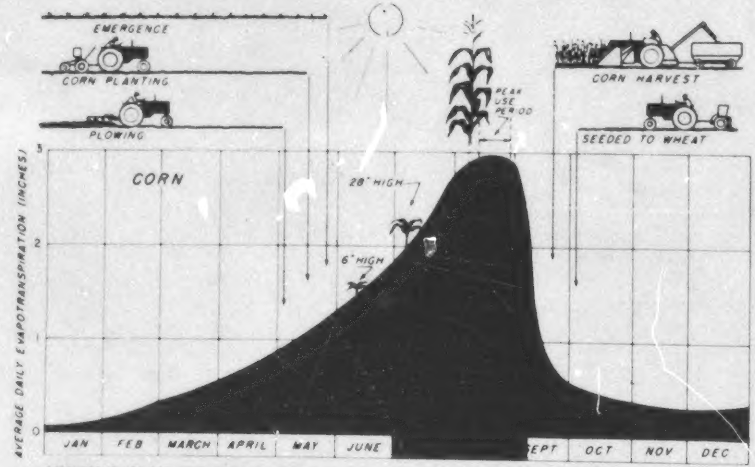
Total annual streamflow from the unterraced grass watershed averaged 4.8 inches. Surface runoff was 1.8 inches, and subsurface flow was 3.0 inches. Increased infiltration on the grass watershed caused the path of flow to be quite different from that on the unterraced corn watershed.

Total streamflow from the mixed-cover watershed averaged 5.8 inches, with surface runoff of 1.7 inches and subsurface flow of 4.1 inches. These values are intermediate between those from the single-cover watersheds, as expected.

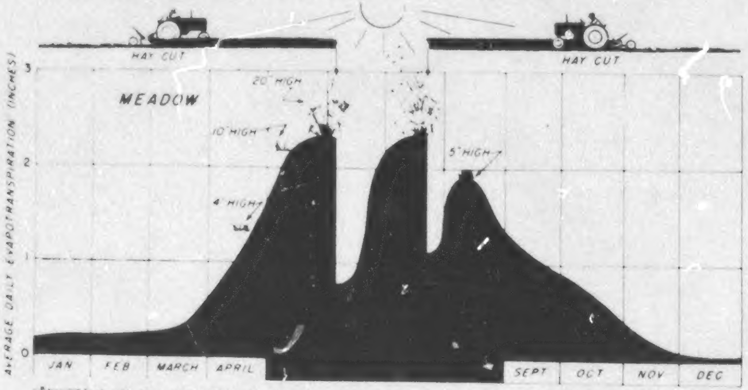
Grass apparently used more water than corn, as findings at other ARS locations bear out (figure 2). For example, at Coshocton, Ohio, corn grown in lysimeters used about 10 percent less water than grass during the April to November growing season. Monthly evapotranspiration was quite different between corn and grass. Hay cutting also reduced evapotranspiration to about half the preharvest rate. Evaporation is important in waste disposal because water dissipated into the atmosphere is not available for runoff or leaching.

The previous examples illustrate some of the practical potentials for influencing water regimes by land management. On small, uniform plots or fields, these effects are readily discernible. On larger areas, variations in topography, soils, geology, land use, and microclimate greatly complicate the picture. In fact, the particular pattern of areal distribution of water-absorbing and water-shedding areas over the landscape can be, and usually is, the overriding factor determining water disposition. For example, consider the idealized watershed diagram in figure 3. This area is composed of three soil-landform units: (1) moderately deep residual uplands, (2) shallow eroded hillslopes, and (3) deep alluvial bottomlands. Differences in infiltration, slope, land use, and water storage capacity among these units determine the entire hydrologic performance of the watershed. Excess water on the hillslopes invariably cascades over the alluvium, to be absorbed there or to add to the excess on this lower zone. In western watersheds the alluvium remains dry, absorbing all but enormous flows produced by extreme events. The converse is true in the humid East, where less intense but more prolonged rains on saturated alluvium cause most flow. The fate of a waste on the land will be determined in part by where it is placed in relation to the pattern of soil-land form units in the particular watershed.

The three hydrologic response zones illustrated in figure 3 probably represent the simplest pattern of soil-land-form units one might encounter. Land capability classes, as mapped by the Soil Conservation Service, provide a grouping of not only hydrologically similar soils and landforms but also of land use potentials. Elevation sequences



CONSUMPTIVE USE FOR YEAR 1953 WITH CORN, FOLLOWED BY WINTER WHEAT UNDER IRRIGATION ON LYSIMETER Y102 C AT THE SOIL AND WATER CONSERVATION RESEARCH STATION, COSHOCTON, OHIO



CONSUMPTIVE USE FOR YEAR 1955 WITH IRRIGATED FIRST YEAR MEADOW OF ALFALFA, RED CLOVER, TIMOTHY ON LYSIMETER Y102 C AT THE SOIL AND WATER CONSERVATION RESEARCH STATION, COSHOCTON, OHIO

FIGURE 2.—Evapotranspiration under corn and grass, Coshocton, Ohio.

of land capability groups observed in the watersheds studied thus far appear to offer a convenient framework for computing water storages and flows in complex watersheds, commensurate with the hydraulics of the system as well as land use.

The following illustrates the utility of combining the knowledge of hydrologic effects caused by land treatment with mathematical models of watershed performance in a recent study at the Department of Agriculture Hydrograph Laboratory in Beltsville, Maryland.

A WORKING MODEL

The laboratory, through an interdisciplinary team approach, has developed a comprehensive digital computer model for continuously

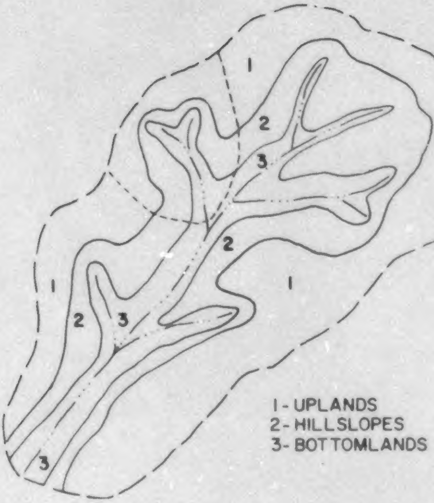


FIGURE 3.—Soil-landform in a hypothetical watershed.

simulating all hydrologic processes in complex agricultural watersheds. The model accounts for the disposition of measured precipitation to surface storage, infiltration, evapotranspiration, and subsurface and surface flows. Soil differences and land use effects are built into the model so that by changing the appropriate parameters the modeler can simulate, at will, the effects of land use changes or engineering structures on water flow throughout the system.

Recently, the model was applied to rainfall-streamflow records from three ARS experimental watersheds contrasting sharply in soils, land use, and climate. The experiment was designed to simulate the influence of land use management on total flows from 3,500- to 4,500-acre research watersheds at Coshocton, Ohio; Hastings, Nebraska; and Riesel, Texas (figure 4). Three levels of land use management were simulated in each watershed: (1) *exploitive land use*—farming all land that could reasonably be put in row crops without regard to conservation practices, (2) *conservative land use*—row crops in rotation plus recommended soil protection and water management practices, and (3) *pasture*—grasses on all land. Results are shown in figure 5.

The model was "calibrated" to records from the existing mixed-cover conditions prevailing in each watershed during an 8-year period. The three hypothetical land-use schemes were then simulated.

Exploitive use of the land increased streamflow at each location. Conservative use of the land increased streamflow at Coshocton and Riesel, but decreased it at Hastings. Retiring the land to grass resulted in a streamflow increase at Coshocton but a reduction at the other locations. Cutting of forests at Coshocton caused some increase under all three treatments.

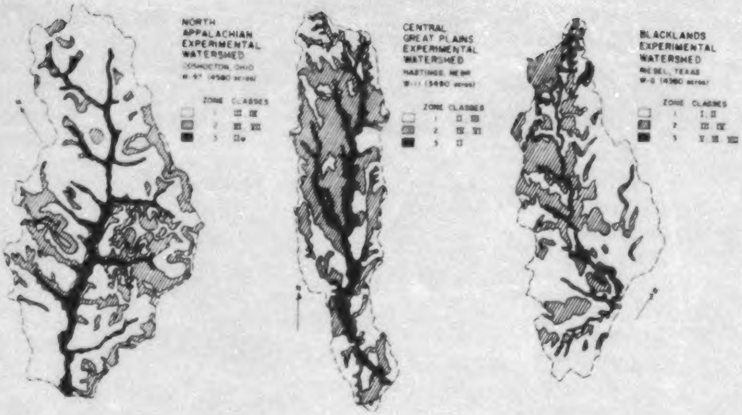

NORTH APPALACHIAN EXPERIMENTAL WATERSHED
COSHOCTON, OHIO
ZONE CLASSES
1
2
3
CENTRAL GREAT PLAINS EXPERIMENTAL WATERSHED
HASTINGS, NEBR
(3480 acres)
ZONE CLASSES
1
2
3
BLACKLANDS EXPERIMENTAL WATERSHED
RIESEL, TEXAS
ZONE CLASSES
1
2
3

FIGURE 4.—Land capability groups in three experimental watersheds.

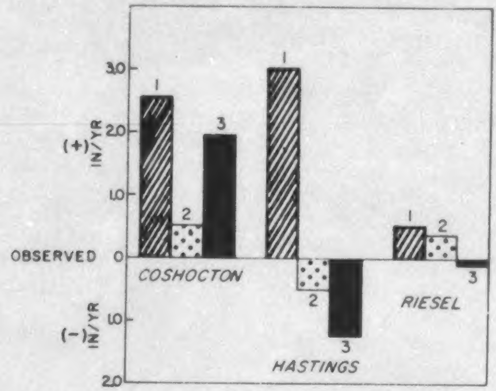


FIGURE 5.—Comparative water yields.

In each case there is a rational physical explanation for the streamflow changes predicted by the model. Soil characteristics are the primary reason for the different effects. The less dramatic effects at Riesel are due to inherently low infiltration rates, while cracking induced by drying influenced the rate under grass, which used more water than the other treatments.

Water yields were less affected at Coshocton than at Hastings because increased infiltration at Coshocton simply results in more return flow, whereas return flow is negligible at Hastings.

Effects of land use are thus explained by changes in infiltration and evapotranspiration at each location.

As an aid to understanding and predicting water movements within agricultural watersheds, watershed models offered a powerful, yet relatively unused tool for determining the movement of dissolved or suspended pollutants. If models are constructed in such a way that land management effects are predictable, they also become a useful tool in pollution control planning. As shown, land use adjustments exert their effects primarily on paths of water flow. If increased infiltration results in more flow through the root zone or plow layer, greater losses of soluble chemicals to seepage and groundwater will undoubtedly occur. On the other hand, if a land use change reduces infiltration, the greater surface flows will transport more surface materials. Therefore, placement of agricultural wastes or applied chemicals should be accomplished judiciously with full consideration of the water flow paths, and land use should be adjusted to achieve the desired result.

RURAL NEW YORK STATE'S AGRICULTURAL DISTRICTS

AN OVERVIEW OF THE TAXATION OF OPEN LAND

DIFFERENTIAL ASSESSMENT OF OPEN SPACE AND FARMLAND

STATUS OF AD VALOREM TAXATION ON RURAL LAND IN GEORGIA—1972

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RURAL NEW YORK STATE'S AGRICULTURAL DISTRICTS

[By H. E. Conklin, Department of Agricultural Economics, Ithaca*]

ABSTRACT

A new law in New York State is intended to encourage continued farming where speculation and other urban influences otherwise would bring it to an end long before nonfarm uses are ready to occupy all of the area. This law offers a package of aids and incentives to farmers who form agricultural districts under its provisions. It also provides some positive discouragements to nonfarm developments within these agricultural districts.

The New York agricultural district law is quite different from anything tried so far in any other state. It is believed that the package of provisions in the New York law will lead to the long term dedication of many areas to farming, but the law is constructed so that an orderly transfer of land from farming to urban uses is possible.

Agricultural districting is a relatively new device to prevent urban scatteration and speculation from destroying good farmland. Since September 1971, New York State has had a law in effect that permits the formation of agricultural districts as a means of keeping productive farmland in agriculture until it is *really* needed for other uses.

Many states have become concerned about the preservation of farmland. Hawaii, for example, has undertaken a major program of agricultural zoning, but it is the only state in which such an exercise of police power is used extensively for this purpose. A proposal for a somewhat similar program in New York was rejected by the state legislature. Other states have passed laws in recent years that are intended to keep taxes on farmland in line with farming's capacity to pay, although these laws vary widely in their details.

New York's agricultural-district law does not grant police power, but it does involve the creation of specifically delineated areas. It also includes special tax provisions, but they are more attractive inside the districts than outside of them. The uniqueness of New York's statute arises principally from several nontax incentives for the continuation of farming within the districts, and from the method by which the districts may be established.

The New York agricultural district legislation contains two major provisions, one specifying the steps required to create a district, and the other stating those special provisions of law that apply within

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*Reprinted from New York's Food and Life Sciences, Vol. 5, No. 4, October-December 1972.

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the districts once established. More than a half-dozen districts have already been formed and many more are in various stages of formation. Additionally, there is a general interest in districting throughout the better farming areas of the state.

Agricultural districts in New York State are created by local initiative following the steps summarized below:

Landowners prepare a district proposal and submit it to the county legislative body, which in turn refers the proposal to its agricultural advisory committee for consideration. (If none exists, the county legislature would name an advisory committee of four farmers, four agri-businessmen, and one county legislator.) The agricultural advisory committee and the county planning board report their recommendations to the county legislature, one or more public hearings are held on the proposal, and the county legislature may then adopt it, or a modification, as a plan.

The county legislature next submits the plan to the state's Commissioner of Environmental Conservation, who seeks recommendations on it from the state Agricultural Resources Commission and the state Office of Planning Services. The Commissioner may then certify the plan (or a modification of it) as eligible for a district.

Following certification, the county legislature may hold another public hearing on the plan; if the plan was modified by the Commissioner, the county must hold another hearing. After certification and the additional public hearing, if any, the county legislature has a final opportunity to approve or disapprove of the agricultural district. Beginning in 1974, the Commissioner of Environmental Conservation may create agricultural districts to encompass "unique and irreplaceable agricultural lands", but to do so requires the cooperation of local people, the Agricultural Resources Commission, and the Office of Planning Services. Whether created by the county's legislature or by the Commissioner of Environmental Conservation, five major provisions of law apply within a district:

1. Farmers may apply for an exemption from taxation on the value of their land in excess of its value for farming. Most jurisdictions of the state in the past have assessed farms on the basis of their value for farming, until the owners began to sell land for nonfarm development, although this was not authorized by statute. Such authorization has become increasingly necessary for continuation of this policy, and the agricultural district law provides it, if farmers meet certain restricting qualifications and make annual applications. However, if they convert any land to nonfarm purposes, farmers are required to pay a rollback (for up to five years) of any taxes from which they gain exemptions under this law.

2. Local governments may not restrict or regulate farm structures or farming practices beyond the requirements of health and safety.

3. State agencies must modify administrative regulations and procedures to encourage the maintenance of agriculture.

4. The right of public agencies to acquire land by eminent domain is modified (though not removed) and they are required to consider alternative areas.

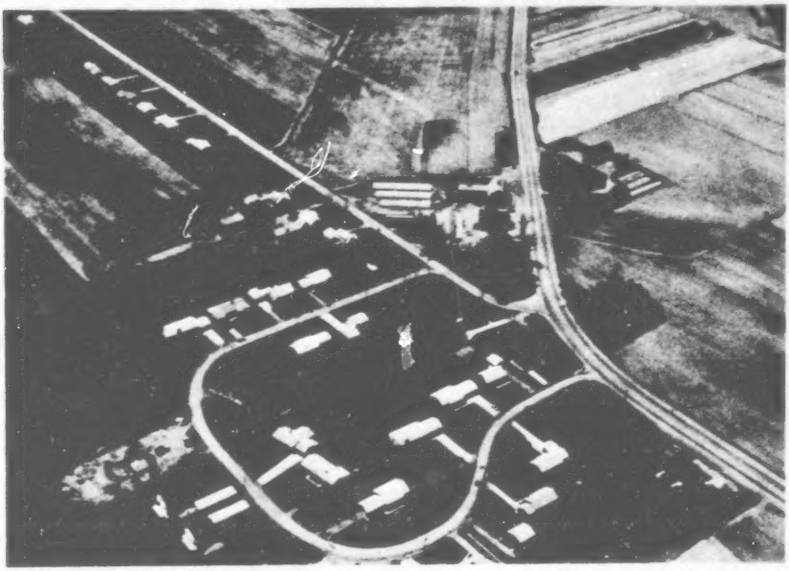
5. The right of public agencies to provide funds for facilities (such as sewer and water) that would encourage nonfarm development also is modified.

6. The power of public service districts to tax farm land for sewer, water, power, and nonfarm drainage is restricted.

The agricultural district law also provides individual farmers who are not in a district an opportunity to obtain agricultural-value assessments. They must, in writing, commit their land to farming and are subject to significant penalties (rather than a rollback) if they violate the commitment. While this feature of the law can provide relief from taxation that otherwise would force discontinuance of farming, it is not likely to contribute as much toward the long-run dedication of land to farming as will the district arrangement.

The northeastern part of the United States has witnessed great urban expansion in recent years. The "megalopolis" of the East Coast includes a substantial portion of this state. Urban growth has stimulated visions of more growth, until many landowners have become blinded by the resulting speculative fever. Realistically, there is no possibility that we can have wall-to-wall city in New York State or even most parts of it. There are more than 30 million acres in the state—considerably more than an acre apiece for every man, woman and child! Thus, many who hope for a high-price sale are due for disappointment. Yet while that hope lasts, it can destroy farming.

Commercial agriculture in any form usually requires large amounts of capital in land improvements, equipment, and livestock. Dairy farming, the most common type in New York, has especially large investment requirements. Additionally, farming must be supported by active and efficient agribusiness enterprises as sources of production supplies and for marketing farm products; these likewise involve large investments in plant and equipment.



Agricultural districting offers protection from the speculative pressures of urban development.

Rates of technological change in both farming and agribusiness are high nationally, and to remain competitive, any given area must keep pace. Thus, new investments must be added continously. Cases in point are illustrated by present needs for rebuilding or extensively remodeling a high proportion of the dairy barns, dairy feed concentrate handling facilities, and milk receiving plants in the state.

But the farmer who hopes to sell his farm for more than its value in farming seldom builds a new barn. He hopes, of course, that he will not need it, and he knows that a new barn would not increase the sale value to a nonfarm buyer. When farmers stop building new barns and making other investments, agribusinessmen follow suit by relaxing their efforts to modernize and offer better services. General morale in agriculture may decline to a point where young men who would like to farm locally move elsewhere instead. From here on, agricultural disintegration accelerates. The individual farmer who tries to resist soon finds that farming in his locality has lost its "critical mass"; he is an "odd ball" among his neighbors, having to travel farther each year to find men with like interests, businesses geared to his needs, and veterinarians willing to work with large animals.

In theory, agricultural disintegration can be turned about at will, but in fact it often has been irreversible. To reverse such a trend requires that many people move in concert, and there has been no mechanism for obtaining a concert "director." Even after it becomes apparent that an area will not become entirely city, or that frontage sales cannot cover total farm values, agricultural disintegration usually continues.

New York's agricultural industry is important enough to justify concern. Our farm products are worth about $3 billion in consumer sales, and expenditures for their production and processing contribute to local economies. Agricultural employment is equivalent to 200,000 full-time workers—a payroll that would be difficult to replace if lost. Moreover, the needs for agricultural land are small relative to the total area of the state; only 5 million of our 30 million acres would keep the industry growing in terms of total output. There is plenty of space for other uses.

The agricultural-district law is designed to help people avoid the quicksand of speculation; it provides farmers an opportunity to publicly declare their desire to remain in farming and reduces the pressures that would otherwise push them toward a speculative posture. In effect, agricultural districting provides the "concert" element; farmers thus agree not to push one another toward speculative situations while other provisions of the law reduce the likelihood that others will push them to such ends.

Overall, the agricultural-district law gives county legislatures and state agencies somewhat greater control over land use. On the other hand, that control is contingent upon landowner initiative and is limited to deciding what proposed districts may actually be created, their boundaries, and how long they will exist. The county and state have authority to continue any district indefinitely, regardless of local wishes. Since each district must be reexamined every eight years, however, when any portion of it is in really strong demand for nonfarm uses, it may be expected that its boundary would be changed upon such review findings.

It seems more likely that the land in many districts will become dedicated to farming for long periods. Economic and social activity will become geared to a continuation of agriculture, and peoples' expectations and plans will be adjusted accordingly. A few landowners may have to forgo some large capital gains, but this will not bring mental anguish because no one will be sure he could have gotten them, nor at any time will anyone plan on them. For urban development there nearly always will be plenty of nonagricultural land nearby that can be adapted to the needs of expanding urban uses at nominal additional costs.

The agricultural-district law provides no "ironclad" guarantee that any particular farm area will be kept in farming. It does, however, provide an opportunity for agricutural people to avoid some of the pressures that otherwise could force them to liquidate. This can both help to maintain an important industry and preserve attractive open space.

Many individuals and organizations contributed to this legislation; their efforts in designing the law were materially aided by this college's contribution of information on land use and rural change obtained through research.

AN OVERVIEW OF THE TAXATION OF OPEN LAND

[By Thomas F. Hady,* Chief, Community Facilities Branch, Economic Research Service, U.S. Department of Agriculture]

The specific subject of this seminar is taxation of agricultural and other open land, and I understand my role to be providing the basic framework on which the subsequent speakers can build. Let me start by outlining three questions that I think you ought to keep before you as you participate in the discussions today and tomorrow.

First, we are talking about a specific tax, the general property tax. What are the characteristics of this tax that are important for making decisions about taxing open land?

Second, the area most often involved is the rural-urban fringe. What are the problems in that area, and what are the social and economic forces that produce them?

Third, States have tried specific programs for altering the tax treatment of land on the rural-urban fringe. What has been their experience with those programs?

I'll lead off by trying to introduce all three of these questions. Subsequent speakers will be telling you much more about all of them.

THE GENERAL PROPERTY TAX

The property tax has a long history. There are records of a land tax in Greece in 596 BC. Many of the taxes levied in various principalities and kingdoms during medieval times had some of the characteristics of the property tax, and it was one of the mainstays of finance for many colonies during the early days of our own country.

The general property tax really came into its own, however, in the first half of the last century. The principle of taxing according to market value became firmly established, and the base of the tax gradually was broadened. As Richard T. Ely put it, in a much-quoted statement: "The distinguishing feature of the system may be described in a single sentence. It is the taxation of all property, movable and immovable, visible and invisible, or real and personal, as we say in America, at one uniform rate."

As developed in the U.S., the general property tax has a number of important characteristics. One is its property base. It is a tax on wealth, not a tax on income. More specifically, it is a tax on the wealth of the taxpayer on the assessment date—not on any of the other 364 days of the year. At least in its original conception, it was to be *universal*—it was to reach all forms of wealth. As we shall see, it has gradually retreated from this grand design. The tax typically is *uniform*—all property (unless exempt) is to be taxed at the same rate. It is

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*The conclusions and opinions are those of the author, and not necessarily those of the U.S. Department of Agriculture.

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impersonal—it is levied on the property, not on the taxpayer. If the tax is not paid, the government sells the property; it does not throw the owner in jail.

Most importantly, in the American tradition the property tax is levied on an *ad valorem* basis—on the value of the property. Furthermore, value has traditionally meant market value, the price at which the property would change hands between a willing buyer and a willing seller in an arms-length transaction. Of course, most property is not actually assessed at market value in the U.S.—it averages more like a third of market. But this really makes little difference, unless statutory limits on tax rates, or some types of exemptions, come into play. If all property is assessed at the same fraction of its market value, it will make little difference whether you assess at a third of market value and levy a rate of $3 per $100 of assessed value or assess at market and levy $1 per $100.

By now, you may be starting to get the idea that the property tax often does not measure up to this idealized description. You are right. We have gradually changed our property tax laws so that they no longer conform fully to the pattern. Furthermore, the tax is often very poorly administered.

Consider, for example, the principle of universality. The concept has much to recommend it. One important advantage is that it helps to maintain equity. If we are going to tax men on their wealth, then it seems only fair that we should tax that wealth regardless of the form in which it is held; the stockholder should pay as well as the landowner. But gradually other considerations have led us away from this approach. Intangible property—stocks and bonds and the like—is very hard to locate if the taxpayer wants to conceal it. Hence the tax on intangibles tends to become a tax on honesty, rather than one on property. It has gradually been abolished in nearly all the States. For much the same reasons, the personal property tax on household goods is on its way out. An additional factor, here, is that the household goods levy has never been very productive anyhow—one description is that it produces "more squawks than revenue."

Property of charitable and religious agencies has nearly always been exempt. More recently, we have had a series of other exemptions. Homesteads, up to some value, are exempted in a number of States. Property of veterans, or of disabled veterans, is partially exempt in some States. A growing number of States make special provisions for the aged. And, of course, a number of States now provide special treatment for farmland or open space land.

Over the years, State governments have largely left the field of property taxation, and the property tax has become a source of finance primarily for local governments. More accurately, it might be called *the* source of finance for local governments— it typically provides something on the order $9 out of every $10 of local tax revenue, and about $4 out of $10 of all local revenues. In most States, the property tax is about the only source local governments have for increasing their tax revenue. If they need more money, is is likely to come out of increased property taxes.

With the importance of the property tax to local governments, one would think they would pay careful attention to its administration. In point of fact, often they do not. In many areas, assessors still are part-time, elected officials with few qualifications for estimating the value of property. As a result, two identical pieces of property may be assessed at markedly different fractions of their market value. Different types of property—residences and business property, for example—may show even more striking differences.

At least equally serious is the fact that people often expect the assessor to do things which the law specifically directs him not to do. Widow Brown hasn't much income, so the community expects the assessor to "go easy on her." The community wants another industrial plant, so the assessor is expected to under-assess any new plants that move in. But the law is usually clear. It tells the assessor to value *all* property on the basis of its market value.

If the public wants exceptions to this rule, they can instruct their legislators to pass the necessary laws. This is the reason that the Advisory Commission on Intergovernmental Relations recommends that States first make sure the laws on the books are the ones they want their assessors to carry out—and then make it clear that they expect that these laws will be carried out.

The American property tax, then, is a very important source of revenue for local governments. In its conception 100 years ago, this tax was to be levied on nearly all types of property. The property tax is gradually moving away from that grand concept, however. For one thing, the base is steadily being eroded by the exemption of additional kinds of property. In each case, the proponents have good arguments for exempting that type of property. Also in each case, however, exempting more property creates some problems which may not always get adequate consideration. I can illustrate those problems better when we turn to the specific discussion of the taxation of farmland. A second deviation from the grand concept of the general property tax has been its administration. Inadequate training of assessors and public expectations contrary to the law have led to many situations in which property taxes are not apportioned among taxpayers in accordance with the value of their taxable property. I might add that the property tax is not alone in having these characteristics. The income tax fails to tax many items which the economist would consider to be income, and the sales tax does not usually reach all sales.

TAXES AND GOVERNMENT ON THE RURAL-URBAN FRINGE

Let's turn to the problems of the rural-urban fringes of a growing city. I can illustrate part of the problem with a personal example. In the late 1940's, my family moved into the outskirts of Minneapolis. We were already examples of the first wave of suburbanites—my father worked in town—but the area still had a decidedly rural character. Directly behind our one-acre lot on a major highway, for example, was land belonging to two active farms. I attended the eighth grade in a consolidated school which had eight classrooms in use and three vacant. Four years later, that school had an eight room addition, only six grades in the building, and was overflowing. By the end of another four years, the area had its own high school. Housing developments were growing all around. Some of them had central water systems, which it was expected that the village government (it was a rural township government when we moved in) would soon take over. Discussion of the need for a central sewer system was growing. The local swimming hole, "the clay pit," had been cleaned out and had a part-time lifeguard, and there was discussion of the need to provide other forms of recreation. Police services had formerly come from the County Sheriff's office; now the community found it necessary to hire policemen. Similarly, fire services had been provided by a small city some five or ten miles away; the community found it necessary to organize their own volunteer fire department. In later years, they found it necessary to pay some of the firemen.

All of these services cost money, and any of you who have experienced the process have the tax bills to prove it. At the same time, land values appreciate very rapidly. Along with these high land values, of course, come higher property taxes, and landowners object.

Another change is taking place in suburbia, too. Americans seem to be increasingly interested in trying to control their surroundings, and they seem to be increasingly willing to give up some of their rights to do so as they wish with their own property in order to get that control over their surroundings. As a result, planning has become an important activity in urban areas. This is not the place for a discussion of the entire process of planning and of implementing plans, but I think two observations are important for our discussion. The first observation is that there is no such thing as a "science" of planning which can tell you *the* right plan for a given area. The very essence of planning is the highly political process of reconciling conflicting views and values. One common example is the fight that often develops between the landowner who wants to put in a shopping center and the local residents who want convenient shopping, on the one hand, and residents of the area near the proposed shopping center, on the other hand, over where to put shopping centers. Another example is provided by the following lead sentence from an article two weeks ago in *The Washington Star*. "Spurred by reports of alleged discrimination by some country clubs, support is building here for outright repeal of a Maryland law granting tax breaks to clubs as an incentive for them to maintain open green space."

The second observation is that planning has to be a process of influencing development. In this country, at least, one can't simply plan, zone on the basis of that plan, and then sit back and relax. Americans are not willing to accept the degree of public control over land use that prevails in many European countries, where you may need official permission to change the color of your roof. Personally, I hope they never will. Zoning can be one tool, but you need to find all the other tools you can to influence land use if you are to be successful.

I ought to warn you, also, about some of the things we know little about. It seems to me that one of those is the process by which land use changes from rural to urban. It is commonly observed, for example, that the fact that one parcel of land near a major highway intersection sells for $10,000 an acre for a shopping center doesn't make all the land for five miles around worth $10,000 an acre—and this is undoubtedly correct. The alternative that you are often asked to believe, though, is also wrong. That land probably is worth considerably more than its value for strictly agricultural uses. The real problem is that we know so little about what influences both the pace of urban development and the specific kinds of uses in which land eventually is used. It is hard to say just how much one ought to discount that $10,000 an acre to take account of the fact that the tract we are assessing is a half-mile away on a country road, is hilly, contains areas in which the soil doesn't "percolate" easily, and so forth. A further problem is that we don't know how risky it is to hold fringe-area land for future development. If it is quite risky, that speculator we are willing to condemn so quickly just might be performing a useful economic function.

Two important things, then, are happening on the rural-urban fringe. One is that property taxes are going up. The second is that there is more interest in planning. Both of these phenomena lead to interest in differential assessment. First, differential assessment serves as a means for large land owners to cut their taxes. Second, it serves as a tool for carrying out plans.

DIFFERENTIAL ASSESSMENT LAWS

This pressure for some sort of special treatment for farm and open space land has led to legislative action in nearly half of our States, and it is becoming increasingly hard to summarize these laws. In broad terms, however, they can still be categorized in three groups. I call the groups "preferential assessment," "deferred taxation," and "restrictive agreements." I use the term, "differential assessment" to denote all three types, collectively.

Preferential assessment

Under the preferential assessment approach, land devoted to agricultural use is assessed on the basis of its value in that use, and market values reflecting potential uses such as housing subdivisions are ignored. The Maryland use-value assessment law is a good example of this approach. It says in part ". . . lands which are actively devoted to farm or agricultural use shall be assessed on the basis of such use, and shall not be assessed as if subdivided . . ." The Act also provides for the State Department of Assessment and Taxation to establish criteria for determining whether lands are bona fide farms and qualify for preferential assessment. My current list shows laws of this type in Arkansas, Colorado, Connecticut, Delaware, Florida, Indiana, Iowa, Maryland, New Mexico, and South Dakota. I should note that not all of these laws clearly fall in this category—some other researchers would classify a few of the States in one of the other groups. Maryland, for example, now has deferred taxation in some limited cases.

Opponents of these laws commonly raise several objections. In the first place landowners are being given a substantial tax advantage and little is required of them. In return, all they have to do is to keep the land in agricultural use for the year in question (or more accurately, have it in agricultural use on the assessment date, and perhaps, for 2 or 3 years preceding). Furthermore, it is argued that nonfarmer speculators succeed in getting their land classified as farm land by conducting very minimal farming operations on it, and that the laws benefit these speculators more than they do the *bona fide* farmers.

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Deferred taxation

An example of the deferred tax law is found in New Jersey. Specifically, the lands must be not less than 5 acres in area, and must be determined by the assessing officer of the taxing jurisdiction to be actively devoted to agricultural or horticultural uses and to have been so devoted for at least 2 successive years immediately preceding the tax year in issue. When any land assessed under this Act passes into nonagricultural uses a "rollback" tax is levied. This tax is levied for the year in which the land use changes and the 2 years immediately preceeding. It is equal to the amount of tax which was saved, each year, because of the special agricultural assessment. Alaska, Kentucky, Minnesota, Oregon, Rhode Island, Texas, Utah, and Virginia have similar laws. Oregon charges interest on the deferred taxes. The effect of a deferred tax provision is to remove some of the financial incentive for an individual who is holding land for relatively near-term urban use to apply for the differential assessment. He will save very little money. The effect depends, in substantial measure, on the length of the deferral period.

An additional advantage claimed for the deferred tax is that it provides additional revenue at exactly the time when it is needed for new schools, sewer extensions, and other community services.

Restrictive agreements

Both preferential assessment and the deferred tax leave the community little choice. If the land is in agricultural use, it must be assessed on that basis, at least if the owner applies for the assessment. The community may have decided that the farm is in an area where urban growth should be encouraged, but it has no alternative to granting financial benefits to those who want to continue farming.

Several States have met this problem by legislation which allows the local government and the landowner to enter into a voluntary agreement under which the landowner agrees to keep his land in agricultural use for a period of five or ten years into the future. In return he is granted assessment on that basis. In Hawaii, the landowner may petition the State. If the State finds that the land is suitable for the intended use, and that the use is in accordance with "the over-all development plan of the State," the petition is approved. The landowner forfeits any right to change the use of his land for a minimum period of ten years. The agreement is automatically renewable indefinitely, subject to cancellation by either party on five years' notice at any time after the fifth year. In other words, use of the land is initially restricted for ten years, and always is restricted for five years into the future. If the owner fails to observe the restrictions on use of his land, all of the difference between the taxes that were paid and those that would have been paid under the higher use, back to the time of the initial petition, becomes due. Five percent interest is charged.

The California law provides for legally binding, voluntary agreements between the landowner and the local government. They generally run for an initial term of ten years, are automatically renewable, and can be terminated only on five years' notice. Thus, as in Hawaii, land uses are initially restricted for ten years, and are always restricted for at least five years into the future. The assessor is required to assess on the basis of the legally permitted uses.

The California law has been extensively used; unofficial estimates indicated that nearly two million acres were covered in early 1968, and the number now is undoubtedly larger.

A new law in the State of Washington provides that once a landowner applies to have his farm or open space land taxed on its value in that use, and is accepted by the local legislative body, the land must remain in that use for at least ten years. After the seventh year, the owner can give three years' notice of his desire to revert to the standard method of taxation. When the land reverts to standard taxation, seven years' deferred taxes are collected, with interest. If the owner fails to give the required notice and changes the use of the land, 14 years' deferred taxes, plus a 20 percent penalty, are collected, with interest.

A similar law is on the statute books of Pennsylvania, but appears to have had little use.

EVALUATING DIFFERENTIAL ASSESSMENT LAWS

Earlier, we discussed the problems of development on the rural-urban fringe, and the problems of the property tax. Now, we are in a position to consider differential assessment in relation to each of these sets of problems.

One view of differential assessment is as a tool for implementing a community plan for land use and development. Differential assessment is often urged because it will preserve farming, or because it will preserve open space, both of which the advocates of differential assessment obviously believe should be a part of the State land use policy. There is a broader question involved here. What is the potential contribution of differential assessment to the carrying out of various land use policies?

One thing we need to do is try to avoid semantic traps. I will cheerfully support the thesis that the world would have been a better place if we had never invented the term "open space." The problem is not the actions taken in the name of open space; the majority of these are justified. The problem is that the term covers up a lot of fuzzy thinking which prevents us from really deciding how we want to use our resources. We may not get the right kind of open space, in the right place. Especially in a country such as ours, with a recent history of widely dispersed settlement, open space is a very appealing concept. Too often, people forget to ask the question, *"Open space for what?"* Open space has different meanings in different situations. It may mean recreational areas: Parks, golf courses, and similar land uses. Sometimes, it appears to mean any low density land use other than a junkyard or a dump. Open space may be a tool for forcing city expansion into certain patterns and densities, or it may be areas that have a particularly valuable ecological role—salt marshes, for example.

I would suggest that discussions of differential assessment would be advanced if we forgot about the "open space" terminology and talked about the specific functions of land which we have in mind. For example, if we are talking about recreation, perhaps the tax preference should be confined to recreation areas. Farms are not usually recreation areas. If we are talking about channeling urban development, then it may make sense to offer tax preferences to owners of land in those areas we do not want urban development, if they agree not to permit such development. If we want to preserve lands with particular ecological values, we might offer special tax concessions to the owners of that land, conditioned on their keeping the land in uses which are consistent with their ecological role.

In all of these instances, through, the community should consider the specific uses that are consistent with the specific type of open space it wants to preserve, and restrict its subsidies to those uses. In the case of farming, this might mean that all kinds of farming would be granted special tax benefits, it might mean that no farming would get such benefits, or it might mean that only some types of farming would be allowed the benefits. It might be all right, for example, to let farmers cut hay in a marsh, after a certain date, but not to let them grow vegetables there.

If preservation of farming does have a place in the land use plan, the next question must be whether differential assessment really helps to preserve farming. Unfortunately there is little research, and it is hard to design any, to answer this question. The motives which cause a farmer to continue farming, or to quit, are complex and varied. Factors other than cash income clearly influence decisions to stay in business, and these factors are hard to identify and harder to quantify. It does seem doubtful, however, that tax reductions would loom large in a farmer's decisions when he is offered $5,000 to $7,000 per acre (the average 1963–65 prices near Washington, D.C.), for his land.

One way to find out the effects of differential assessment on land use would be to compare the rates at which land moved out of farming with, and without, these programs. In the case of restrictive agreements, for example, it is known that the California law has been extensively used, and that the penalties are strong enough so that nearly all of that land is likely to remain in agriculture for a number of years. The crucial question, it seems, is how much of the land now under the California Land Conservation Act would have remained in agricultural use anyhow. On this point, I know of little information. I know of even fewer data on other so-called "open space" uses of land.

If these laws actually do help to preserve farming, then it may be doubly important that they be restricted only to the areas in which farming is to be preserved. If tax benefits are made available in areas which are planned to become urban areas, they will restrict the availability of land in those areas and may encourage further "leapfrogging" of urban development, increase the cost of bringing essential public services to the growing population, handicap local planning efforts, and generally obstruct orderly development.

A closely related problem is the objection that these laws are mainly of benefit to speculators, rather than farmers. Anyone who owns land on the urban fringe is, perforce, speculating. For these purposes, however, a speculator seems to be someone who is holding land *primarily* for appreciation in value, rather than current production. These laws seem most likely to benefit speculators if three conditions hold: (1) the benefits are made available to land which is in the probable path of urban expansion, (2) differential assessment is not effective in holding land in agriculture, and (3) the requirements for obtaining differential assessment are easy to meet and restrictions on future land use are few. Under the first two conditions, many farms are likely to pass into the hands of individuals who are not primarily interested in farming and the third condition makes it easy for these individuals to make the minimum effort necessary to obtain differential assessment. This suggests that benefits to speculators are likely to be greatest under the preferential assessment approach, and least under the restrictive agreement approach. The extent of the problem under deferred taxation is a function of the length of the deferral period and the planning horizons of speculators. Benefits to speculators will be greater if the deferral period is short and planning horizons are long.

DIFFERENTIAL ASSESSMENT AND TAX POLICY

Adam Smith said taxes should be equitable, certain, convenient, and economical. These criteria are still cited. For our purposes, however, a more modern set may be better: social justice, consistency with economic goals, ease of administration and compliance, and revenue adequacy.

I think it is fair to say that the average economist trained in public finance will be suspicious of differential assessment before he even begins to study it. This is because he has had previous experience with attempts to provide special benefits to special groups through the tax system, and has seen that these attempts often produce new inequities, seriously erode the revenue productivity of the tax, or produce serious administrative problems. The question to investigate is whether this initial skepticism is borne out by the facts.

Social justice

One of the main arguments usually advanced for differential assessment says that we need differential assessment because farm incomes are low in relation to the property taxes levied on farmers. Hence, it is argued, farmers pay more property taxes in proportion to their ability to pay than do other suburban residents, on the average.

That argument, like most, has another side. We have never satisfactorily defined ability to pay taxes. Many people would argue, though, that an individual's wealth also affects his ability to pay. Farmers own a lot of valuable land on the rural urban fringe, and this wealth should be taken into account when costs of government are distributed among citizens.

Furthermore, other citizens on the rural urban fringe pay taxes out of proportion to their incomes. If you lower the farmers' taxes, you will have to raise everyone else's in order to provide the same revenue. This will intensify the differences among other taxpayers.

Thirdly, some argue that the farmer's lack of income is partly an illusion. He lacks cash income, but his net worth often has gone up substantially each year as a result of rising land prices.

Differential assessment is claimed to serve social justice on another set of grounds, too; the farmer pays property taxes entirely out of proportion to the benefits he received from local government. Opponents will argue that this is true of many other groups of suburban residents and that exempting the farmer will only compound the problems of some of the other residents. Some people will go a step further, and argue that the property tax correlates so poorly with ability to pay and with benefits received that it should be replaced entirely or greatly deemphasized as a source of local finance.

I think we have to say that there is no clear answer to the question of whether differential assessment is more equitable than *ad valorem* assessment.

Consistency with economic goals

In one sense, all of the discussion of differential assessment and development policy was concerned with its consistency with economic goals. But we should consider some other goals, such as price stability, full employment, and economic efficiency. I doubt that the implications for price stability and for full employment are very important. A presumptive case can be made, on technical economic grounds, that differential assessment interferes with economic efficiency—our ability to get the most satisfaction we can from our limited stock of resources. But, with all sorts of other types of property already partly or wholly exempt from the property tax, it is not clear that differential assessment makes the situation any worse.

Ease of administration and compliance

Whatever else one says about differential assessment, ease of administration does not appear to be one of its virtues. Both the process of determining which property qualifies for the special treatment and the process of placing a value on the property seem to raise difficult problems.

Under both the preferential assessment and the deferred tax approaches, the common procedure is to provide a broad definition of eligible property in the statute, supplemented in some cases by administrative regulation, and then leave the assessor to apply these rules to determine whether a particular parcel of property qualifies. It is apparently not easy to write a set of rules which do not leave a good deal to the discretion of the assessor, and the assessor is not ordinarily thought of as a policy-making official.

Related, and probably more difficult, is the problem of finding a value for land in agricultural use. In theory, one capitalizes the earning power of land when devoted to the permitted uses. In practice, this is difficult. Further, the assessor likes to have comparable sales against which to check his assessments. These are never easy to find, but they are much harder under differential assessment, since there will be few sales in which the price reflects only agricultural value. Again, the approach used in California, Hawaii, and Washington may be an improvement.

Since the restriction runs with the land, there are likely to be a few sales in which the permitted uses are the only ones principally involved.

Even in theory, however, the problem of defining a relevant standard of value under differential assessment is not a particularly simple one. At least in the case of normal assessment, we have market value as a standard. When we move to differential assessment, we assess on the basis of value in agriculture. The trouble is that there seem to be at least two interpretations for that term: (1) What the land would be worth on the market if it were a hundred miles or more from the nearest city. (2) The capitalized value of the earnings from the land.

The deferred tax approach requires the assessor to keep two sets of records, and assessors typically object to the additional paperwork. It has never been clear to me, however, to what extent this was simply an objection to the paperwork, and to what extent it was an objection to the whole set of problems involved in finding a value in agricultural use.

One good thing can be said about differential assessment from an administrative standpoint. In some areas where differential assessment laws are not in effect, there appears to be strong pressure on local assessors to provide preference on an informal basis. At least the differential assessment laws bring these *de facto* preferences out into the open.

Revenue adequacy

One way of phrasing the revenue adequacy question, in this context, is "How much will general property tax rates have to be raised to maintain revenue, if differential assessment is enacted?" A recent study of eight counties in Maryland found that the median increase in the property tax rate needed to maintain revenues was just under 5 percent, the highest was 13 percent. On the other hand, I understand that preliminary studies in California indicate relatively small impacts on revenues.

CONCLUSIONS

In the light of the slow rate at which our property tax institutions change in this country, it seems to me that adoption of differential assessment laws by nearly half of the States in the last 15 years is just short of a phenomenal rate of change. The process started with the relatively simple preferential assessment approach. Recognition of the problems associated with this approach led first to the deferred tax approach and later to the restrictive agreement approach.

Some years ago two professors at the University of Chicago wrote a book entitled "The Uneasy Case for Progressive Taxation." Their point was not that there was anything clearly wrong with progressive taxation. Rather, they argued that most of the arguments advanced for it had flaws in them, and the case for progressive taxation was not proved. If one wanted to support progressive taxes, we had to do it because he thought they were fair, not because of any scientific arguments.

It seems to me the case for differential assessment is similarly uneasy. There is little solid evidence to tell whether differential assessment will actually preserve farmland, or "open space" in its various forms, but it seems to be doubtful that it will have much effect. If this is the reason for passing the law, the public might well demand strong commitment to keep the land in farm use, as the people of California, Hawaii, and Washington have done.

The case for and against differential assessment as an instrument of tax policy is equally uneasy. One can make a perfectly good argument for differential assessment—even in its plain preferential assessment form—on the basis of tax equity. One can also make a perfectly good argument against differential assessment on these grounds. It does complicate tax administration, and it may cost a substantial amount of revenue.

In short, I do not have a conclusion for or against differential assessment to leave for you this morning. I hope I have succeeded in bringing together some of the relevant facts for you, and left you with some other nagging questions to ponder as the other speakers on this panel bring you other facts and viewpoints to consider.

DIFFERENTIAL ASSESSMENT OF OPEN SPACE AND FARMLAND

[By Thomas F. Hady, Chief, Community Resources Branch, Rural Development Service, U.S. Department of Agriculture[*]]

Back in the late 1950's, Maryland adopted a new approach to assessing farmland in the State. In essence, the legislature told the assessors to assess this land as if it were of value only for farming and to ignore other uses. Since that time, roughly two-thirds of the States have adopted similar laws. Given the glacial pace with which innovations frequently are adopted in the property tax field, the rise of differential assessment is a phenomenon of some interest.

My assignment here is principally to discuss the rapid rise in rural-urban land values and to summarize the various approaches to differential assessment which the various States are using. I am going to do that in reverse order. I believe the motivations for adopting differential assessment laws fall into two broad categories. The first category might be summarized as the equity arguments. These are the various arguments which say that assessment of farmland on the basis of its market value produces tax liabilities for the farmer which are entirely out of line with his current money income. Recent change in farmland values are an especially relevant fact in this discussion, and I want to talk about them later. The second broad category of reasons for adopting differential assessment has to do with its presumed effectiveness as a tool for influencing the pace and direction of development: differential assessment to preserve open space and similar land uses.

Let me turn first, however, to the problem of describing State differential assessment laws so that we know better the phenomenon we are talking about. Describing these laws has become increasingly difficult in the last few years because of the increasing variety of laws. I still like to categorize the laws in three broad groups: preferential assessment, deferred taxes, and restrictive agreements. However, it is increasingly the case that the program in individual States fits into more than one of those prototypes, and it is also true that there is a large variety within each of the three types.

The preferential assessment approach was, historically, the first of the approaches to be used. It originated in Maryland and one or two other States during the latter part of the 1950's. Under this approach, land devoted to agricultural use is to be assessed on the basis of its value in that use. The fact that the land may be worth, say ten times as much for a housing subdivision is to be ignored. Typically, there are no restrictions placed on the use which the owner can make of the land in the future. If the landowner wants to build houses on it next year, there is no impediment to his doing so. Some States, like

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[*] Particular acknowledgment is due Ann Sibold for her contributions to this paper.

Delaware, require that the land be in agricultural use for several years before it is eligible for preferential assessment; others require only that it be in agricultural use on the assessment date. Some States grant preferential assessment only if the landowner applies for it; others grant it to all agricultural land, whether or not the owner applies. Ordinarily, the local government has no choice but to grant preferential assessment to any landowner who meets the statutory criteria. In other words, they cannot say "We will zone this area for agriculture and allow preferential assessment; we will zone that area for housing and will not grant preferential assessment for agricultural uses."

At present, I classify nine States as having preferential assessment laws. They are Arkansas, Colorado, Delaware, Florida, Indiana, Iowa, New Mexico, South Dakota, and Wyoming.

The deferred tax is now the most common approach to differential assessment in the U.S., being used by some 18 States at present. Under the deferred tax, land in agricultural use is assessed on the basis of that use, just as it was under preferential assessment. However, there is an additional provision for collecting back some of the taxes the landowner has saved if he changes the use of the land. In a typical situation, the assessor will record two values when he makes his annual assessment. He records the value of the land in agricultural use, and he records the value which he would have placed on the land had the deferred tax law not been on the books. Then if the land use changes, the assessor can go back and calculate what the taxes would have been in the absence of the special assessment, and for a period of years, the difference is collected. In order to simplify the assessor's task, a few States are now developing deferred tax arrangements which base the tax on the market value at the time the land use changes, rather than on the taxes forgone over the years. This makes it unnecessary for the tax assessor to determine and record two values every year. Recent laws in Connecticut and New Hampshire are examples.

Where the more typical provision, providing for collecting the taxes actually foregone, is used, the typical deferral period is for three years. In other words, if the owner changes the land to some use which does not qualify under the law, the deferred tax is levied for the current year and the two years immediately preceding. A few States, however, use longer terms and several also charge interest on the taxes forgone.

A deferred tax provision removes some of the financial incentive for an individual who is holding land for relatively near-term urban use to apply for the differential assessment. He may save very little money. For example, an individual who expected to hold a tract near a freeway interchange for about ten years and then build a large shopping center on it probably would not be much deterred by a deferred tax provision for a typical State with a three-year tax deferral. He could still save a substantial part of seven years' taxes by qualifying his property as a farm. In the typical State with no interest charges, even a ten-year deferral period would permit him to make money on the interest earnings on his annual tax "savings" from the time the taxes would have been due to the time he actually had to pay them because he built the shopping center.

Currently, 18 States have deferred tax laws: Alaska, Connecticut, Hawaii, Illinois, Kentucky, Maine, Maryland, Minnesota, Montana, New Hampshire, New Jersey, New York, North Carolina, Oregon, Rhode Island, Texas, Utah, and Virginia.

Landowners typically must apply in order to get the benefit of these laws. Often, they must reapply every year, and I understand a few States have had difficulty with owners who simply forgot to reapply, even though their land use had not changed, and suddenly were faced with a bill for three years' deferred taxes.

Local governments, on the other hand, ordinarily have no choice but to grant the tax deferral to any landowner who applies and whose property meets the statutory definitions. In Virginia, county boards have the option of adopting the tax deferral or not. Once they adopt the law, they must apply it to all qualified properties.

The third group of laws are those which provide for an agreement between the landowner and the State or local government. The landowner agrees to restrict the use of his land for a period of years. The local government agrees to provide certain tax concessions. Typically, the use of the land is initially restricted for about ten years, and either party must give several years' notice if he intends to change land use. After he gives that notice, either the land reverts to standard taxation, or some type of charges are imposed. If the owner changes the land use without following the prescribed procedures, much more stringent penalties are imposed. For example, if the landowner fails to follow the prescribed procedures in Washington and changes the use of his land, deferred taxes plus a 20 percent penalty, plus interest, are collected.

The law in Washington provides a good example for other features of the restrictive agreements approach. The landowner applies to have his farm or open space land taxed on its value in that use. Applications for classification as agricultural land are made to the county assessor. Applications for open space or timber land classifications are made to the county legislative authority, which may evaluate the benefits to the general welfare in preserving the current use of the land and compare it with the loss in revenue. Once the application has been accepted, the land must remain in agricultural or open space use for at least ten years.

After the eighth year, the owner can give two years' notice of his desire to revert to the standard method of taxation. When the land reverts to standard taxation, seven years' deferred taxes are collected, with interest. I have already noted the severe penalties if the owner fails to carry out the agreement. Similar laws are on the statute books in Hawaii, California, Maine, Pennsylvania, and Vermont. However, they appear to have had little use in those last three States. Florida has such a law for park, recreational, and open space land, and Maryland for woodland and country clubs.

The New York law has elements of several of the types of laws I have described. In New York, landowners can petition for an agricultural district. The proposal is approved by the county legislative body, which may modify the boundaries of the district. If it approves, the proposal is submitted to the State government which reviews it for consistency with State plans. Once the agricultural district has been created, it will be reviewed every eight years. Land in agricultural districts is eligible for assessment on the basis of agricultural value if it meets certain additional criteria. If the land is converted to another use, deferred taxes are collected for the past five years. If land is not in an agricultural district, but is in agricultural use and meets other criteria, it is eligible to be included in an agreement. The owner commits the land to agricultural use for the next eight years, and it is eligible for taxation on the basis of agricultural value. Commitments must be filed annually. Converting farmland to another use during the eight years subjects the property owner to a penalty, in addition to taxes, of an amount equal to twice the taxes due on all the committed land in the following year.

Let me turn now to several of the overall characteristics of these laws. One problem faced by drafters of differential assessment laws in every case is that of defining the uses to be permitted on land which is given differential assessment. Some States restrict the program entirely to agriculture or to agriculture and horticulture. Others extend the provisions to forest lands, and still others permit a variety of open space uses, including golf courses, wetlands, and other uses of scenic, recreational, or ecological value. Definitions of agriculture also vary. Some laws leave the meaning of "agricultural use" largely to the judgment of the local assessor, sometimes with a local board to help him. Others attempt to spell it out in more specific terms. For example, Oregon says it is "the current employment of land for the purpose of obtaining a profit in money by raising, harvesting, and selling crops, or by the feeding, breeding, management and sale of livestock, poultry, [etc.]." Definitional problems are particularly acute if the legislation attempts to distinguish between "bona fide farmers" and "speculators" and to give benefits to one and not to the other. In an attempt to do this, some States require that some proportion of the landowner's income come from farming. Frequently, the States provide that the land must have been in agricultural use for a specified number of years. Sometimes they use minimum acreage, income, sales, revenue or productivity requirements. Here in Florida, if the sales price of the land is more than three times its agricultural assessment, there is a rebuttable presumption that it is not in agricultural use. Land owned by corporations is not eligible in a few States, and at least two States require that the farm be the owner's residence or have been in his possession for a number of years.

Characteristics of the land and its use are also used. Some States consider whether the way land is being fertilized, limed, tilled, mowed, or reforested suggests that it is commercial agricultural use. The zoning of the land is important in some States.

A few States have extended their differential assessment laws to include open space land, not necessarily used in agriculture. For example, Connecticut includes in open space land, land which would help conservation of natural or scenic resources, protect water supplies, promote conservation, enhance public recreation opportunities, preserve historic sites, promote orderly urban development and a couple of other categories. Decisions about whether a given tract of land would meet these requirements normally are left to local planning commissions, county boards, or other representative bodies.

A second major area in which each of the States has had made a decision has been that of determining agricultural value. Provisions for defining the standard of value to be used for land granted differential assessment vary considerably. Some States merely provide that lands in agricultural use shall be assessed on the basis of that use. Other States are more specific. Oregon, for example, permits the use of comparable sales (market value), but only if those sales are found to be "under conditions that justify the purchase of such agricultural land by a prudent investor for farm use." In the absence of usable comparable sales figures, Oregon assessors join assessors in a number of other States in using a capitalization approach. Often, the capitalization rate is set by the State tax department. New Jersey and a few other States go a step further and provide advisory values for various classes of land in the State. The local assessor then determines the capabilities of the land he is assessing and applies the value.

With that description of State programs, let me turn to the question of objectives in passing laws of this type. As I have indicated, they fall into two broad categories: the equity question and the problem of influencing the pace and direction of development. Let's turn first to the equity question.

The equity arguments for differential assessment come in a number of shapes and sizes. Largely, though, they boil down to an argument that the farmer pays high property taxes, compared to his limited money income. Several factors account for this. In a rural-urban fringe area land values rise very rapidly because of the potential use of the land resources for high intensity urban uses. If taxes are levied on the basis of this higher value, they are likely to be quite out of line with the annual money income earned from farming the property. Compounding this problem, of course, is the fact that local government revenue needs rise rapidly in areas which are becoming urbanized. As a result, tax rates are not likely to go down in the face of a rapidly rising tax base, and the rates may even rise.

Many people feel that these rapidly rising taxes create an unfair situation for farmers in the area. The farm may have been in the family for several generations, and the current operator may be a dedicated farmer. Perhaps all he wants to do is continue farming for the remainder of his working life. In the face of high taxes, it may be extremely difficult for him to do so. Alternatively, many people seem to feel that it is unfair for the farmer to have to sell out fairly early in the ripening process of his land to some other individual, commonly termed a speculator, who will hold the land until it is ripe for urban development. They think the farmer should get the full benefits of the increase in land values. The result of both of these arguments is a further argument for some type of differential assessment.

In the farming areas more removed from urban centers, there are still situations which some people argue are inequitable. Farmland values in general in the United States have risen steadily and fairly rapidly in recent years. They rose by 120 percent in the period from 1960 to 1973. They rose 13 percent in one year alone from March of 1972 until March of 1973. Needless to say, an asset with this kind of a record for increasing in value generates investment demand above that produced by its current annual earning capacity. The market seems to be discounting a very long period of earnings or else expecting a substantial increase in earnings. Substantially the same thing may have happened to farmland values as has happened to the prices of growth stocks on the New York stock exchange. They both sell at high multiples of current earnings.

In the face of this fact, however, the individual farmer may face a cash shortage. His annual money income represents only a part of the total return he gets. The other part comes in the form of appreciation in his land values, but it is vary hard for him to realize that appreciation in hard cash without selling out. (This increase in land values has often been pointed to as the farmer's chief retirement plan.) Nevertheless, farm real estate taxes—averaging $2.63 an acre in 1971—must be paid annually and therefore must be paid out of current money income. As a percentage of gross farm income, taxes levied on farm real estate in the United States rose from 3.2 percent of gross farm income in 1960 to 4.3 percent in 1971. The average U.S. farmer in 1971 paid $1.21 per $100 of estimated market value of his property, up from $0.97 per $100 market value in 1960.

Claims of inequities are basically noneconomic propositions and therefore they are outside my competence as an economist to evaluate. (Of course, as a private citizen I am entitled to the same privileges of having an opinion as anyone else.) Two factual questions ought to be raised, however. One is whether there are not other groups in society who have similar types of problems, and the second is whether a differential assessment program is the most efficient method of meeting these problems. For example, the aged and poor have similar difficulties making their payments. A number of States have moved to meet these problems with so-called circuit-breaker approaches.

The second set of reasons for States to pass differential assessment laws revolve around the increasing interest in the United States in controlling the location and pace of development. In part, this stems from our resurgent interest in ecology; and in part it stems from a simple desire to get some additional control over the way in which our cities grow. Differential assessment is urged as a tool for carrying out these programs.

It seems to me that three questions need to be asked if one is considering a differential assessment law as a tool for controlling land use. These questions might be phrased as (1) What do you want to do? (2) Will differential assessment help do it? and (3) Will differential assessment have unacceptable side effects?

The question of what do you want to do is an important one. The term open space can cover a multitude of things, ranging from a salt marsh which is valuable for ecological reasons to an urban park to a farm whose chief value is the fact that city kids can get some idea of what a farm is like when they drive by on the road. Not all kinds of open space are equally useful for all kinds of purposes. For example, the average farmer, with some considerable justification, objects to having urban residents use his pasture as a picnic ground. If picnic grounds are what is wanted, a differential assessment law aimed at agriculture will not be particularly useful. If, on the other hand, the purpose is to channel development into certain areas, one way of doing it may be to preserve farming in other areas. So it is important to know what it is you want to do before you set out to do it.

The second question, will differential assessment help, involves a number of issues, but one of the most important is the question of the effects of differential assessment laws in preserving land use. Professor Barron is going to talk about this question later in our session this morning, so I will pass it by.

There are two important issues involved in the third question, that of side effects. One is difficulties of administration, which Mr. Shipp will discuss next. The other is problems of increasing taxes on other property, not accorded differential assessment, which Professor Barron is due to discuss.

However, since I don't know what either Mr. Shipp or Professor Barron expect to say, I will take this opportunity to leave you with a few of my own conclusions about differential assessment. I emphasize that these are my individual conclusions as a student of the property tax, and they are not necessarily positions of the U.S. Department of Agriculture or of any of my associates. From the viewpoint of equity, I have indicated I do not feel qualified to pass judgment as an economist on the question, "Are farmers taxed fairly?" However, if the perceived problem is one of farmers' income being inadequate to pay their taxes, and if a complete alternative to the property tax can't be found, I would seriously consider some sort of a circuit-breaker approach. If the problem to be solved is one of guiding land use, differential assessment may have something to offer. But, it seems to me probable that it will have something to offer only if it is used as one of a rather large kit of tools for guiding development, and it is likely to be most effective in the contract and agreement form, where land use is restricted by agreements with some sharp teeth.

STATUS OF AD VALOREM TAXATION ON RURAL LAND IN GEORGIA—1972

[By C. B. Osborn, R. W. Jones and L. A. Hargreaves, Jr.]

ABSTRACT

Portrayed and described in this report are trends in the rapidly changing tax situation on rural lands in Georgia through 1972. State-imposed tax digest factoring dramatically increased assessed valuations from 1971 to 1972. Although reductions in millage in most counties partially offset these increases, significant hikes in taxes on all types of rural lands were still evident. Digest factoring and inequitable rural property tax levels caused significant concern among local tax officials. Solutions applied to similar problems in other states, and a proposal for Georgia, are presented.

In 1963 the University of Georgia School of Forest Resources began conducting periodic investigations into Georgia's rural property tax situation. This research paper is the fifth in the series of publications enumerating the results of these surveys.[1] It updates Georgia's rural property tax picture with information for 1971 and 1972 and also summarizes statewide trends since 1963.

PROCEDURES AND DEFINITION OF TERMS

As for previous surveys, personnel of the Georgia Forestry Commission interviewed tax officials in each county of the state, except as indicated in Figure 1. Tax officials were asked to provide representative high and low assessed values per acre for forest and non-forest land as well as millage rates for their counties. Non-forest land includes cropland.

Fair market value was computed by multiplying reported assessed value by 2½, while tax per acre was determined by multiplying assessments by the millage and dividing the product by 1,000. Midpoint values of each county's fair market value, tax per acre, and millage, were rank-ordered.

Statewide means and medians were then determined for each parameter (Table 1). As concluded from previous surveys, the median proved a better indicator of central tendency than the mean because the latter is so strongly influenced by high property valuations in the relatively few counties experiencing rapid growth. The 1972

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[1] Other publications include: (1) Leon A. Hargreaves, Jr., et al. "The Property Tax on Forest Lands in Georgia," Georgia Forest Research Council Report No. 12, Jan. 1965. (2) L. A. Hargreaves, R. W. Jones and K. M. Sanders, "Effects of Property Revaluation and Taxation on Georgia's Forest Lands," G.F.R.C. Rpt. No. 12—Supplement, Dec. 1967. (3) R. W. Jones, L. A. Hargreaves and C. B. Osborn, "Georgia's Rural Tax Posture," 1968, G.F.R.C. Res. Paper No. 59, Feb. 1969. (4) R. W. Jones and L. A. Hargreaves, "Ad Valorem Taxes on Georgia's Rural Lands," 1970. G.F.R.C. Res. Pap. No. 57, Mar. 1971.

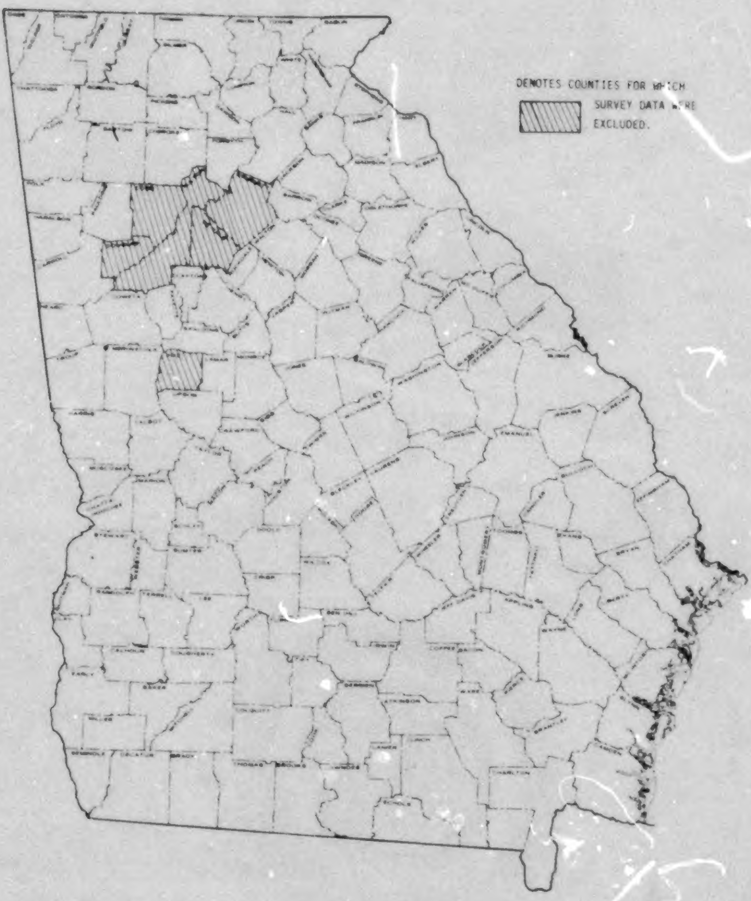

FIGURE 1 - COUNTIES EXCLUDED FROM SURVEY

data reflect substantial increases in assessments that resulted from extensive county tax digest factoring as required by the State Revenue Department.

THE CURRENT SITUATION

From 1971 to 1972, median reported fair market value jumped from $100 to $161 on forest land, a 61% increase. Non-forest land value increased by 59%, up from $134 to $213 (Table 1 and Figure 2). These dramatic hikes in valuation—greater than at any previous time—are attributed to significant state-imposed boosts in county tax digests. More than two-thirds of Georgia's counties were required to adjust their tax digests upwardly by amounts ranging from 4% to 161%. Indicative of the impact of these increases were assertions by

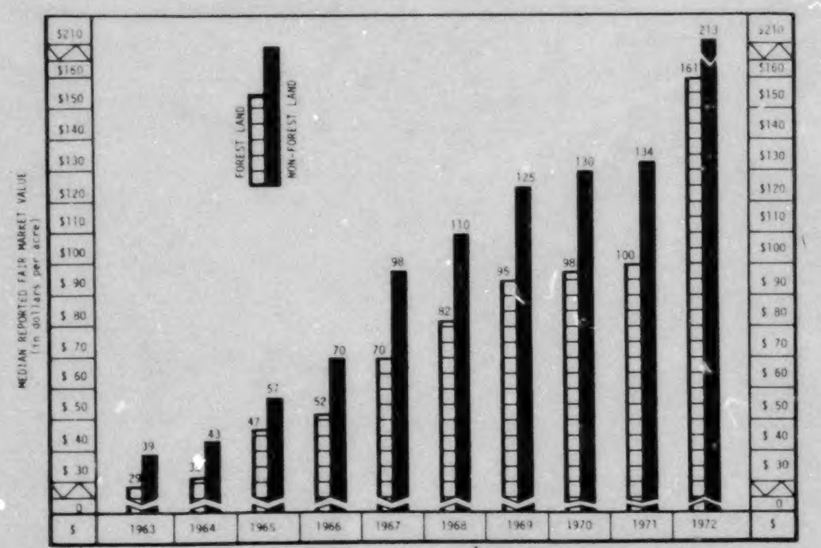

FIGURE 2 · STATEWIDE MEDIAN REPORTED FAIR MARKET VALUE PER ACRE (1963 · 1972)

TABLE 1.—STATEWIDE SUMMARY OF 1971-72 SURVEY OF AD VALOREM TAXES ON RURAL LAND IN GEORGIA

	Forest land		Nonforest land	
	Median	Mean	Median	Mean
Fair market value:				
1971	$100	$132	$134	$189
1972	$161	$239	$213	$317
Percent change	+61	+81	+59	+68
Tax per acre:				
1971	$1.19	$1.64	$1.56	$2.41
1972	$1.34	$2.50	$1.91	$3.37
Percent change	+13	+52	+22	+40
Millage:				
1971	30.00			30.55
1972	22.25			23.55
Percent change	−26			−23

officials interviewed in 61 counties that factoring caused some assessed property values to exceed the legal level of 40% of fair market value.

Decreases in millage partially offset the effects of higher valuation in most counties. The median statewide millage came down from $30.00 in 1971 to $22.25 in 1972, a 26% decrease (Table 1 and Figure 3).

Nevertheless, median tax per acre on forest land increased by 12%—from $1.19 in 1971 to $1.34 in 1972 (Table 1). This was more than twice the 6% increase registered between 1970 and 1971, but still below the nine-year average annual increase of 16%. On non-forest lands, the 1971–1972 jump was from $1.56 to $1.91, a 22% gain.

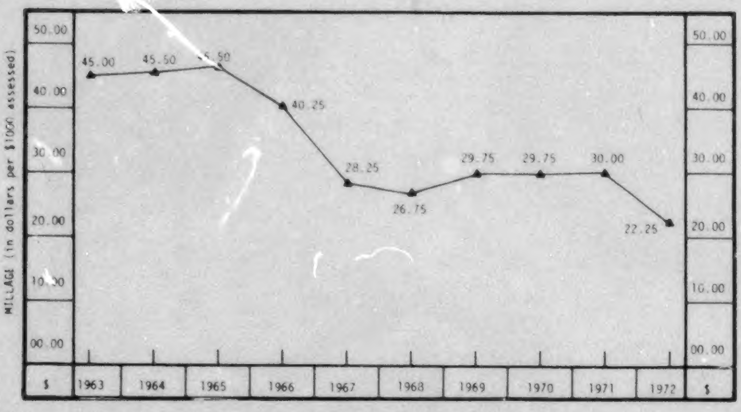

FIGURE 3 - STATEWIDE MEDIAN MILLAGE (1963 - 1972)

This compares with a 1970–1971 increase of 9% and an average annual accretion of 17%.

THE TREND SINCE 1963

Taxes on rural lands in Georgia have increased dramatically in the last decade (Figure 5). In 1963, the median tax per acre on forest land was only $0.36. Comparison with a 1972 median of $1.34 reveals a 272% increase. Non-forested rural land experienced an increase of 315%, as median taxes rose from $0.46 to $1.91 per acre during the same period.

These overall increases figure out to an annual rate of about 16% and 17% for forest and non-forest land, respectively. Nation-wide, the average annual increase in taxes per acre levied on farm real estate, including both land and improvements, has been about 8% during the period 1963–1971 (Figure 4).

CONCERNED TAX OFFICIALS

During the survey, tax officials were also asked to respond to two other questions requiring seasoned opinions of the rural property tax situation in their counties. When asked, "Have rising property taxes created undue or unequal burdens on rural landowners?", officials in 93 counties reported "Yes"; 59 "No"; and six did not respond.[2]

In answer to the query, "Have rising ad valorem taxes contributed to disposal of land by rural landowners?", respondents in 58 counties believed they had, 99 answered "No", and one was undecided.[2] A number of county officials reported that they anticipated legal action as a result of state-required digest factoring—a prediction that has since proven accurate.

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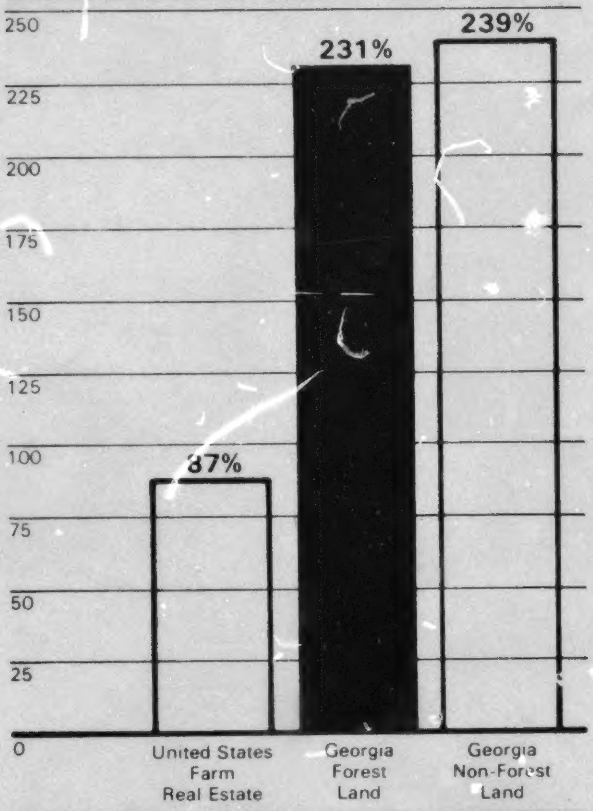
[2] Pike county excluded.

FIGURE 4 — PERCENTAGE INCREASE IN PER ACRE (1963 - 1971)



SOURCE: Adapted from survey data and Farm Real Estate Taxes — Recent Trends and Developments. U.S.D.A., Economic Research Service, Feb., 1973.

RESPONDING TO THE CONCERN

Many other states with growing economies have been facing the same problems in recent years. To improve their situations, 27 states had enacted use-value assessment laws by the end of 1971. Although these laws took various forms, all were designed to protect rural property from prohibitive tax levies which might force conversion of land from agriculture or forestry to other uses.[3]

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[3] Raleigh Barlowe, "Use-Value Assessment: In Retrospect," Paper presented at a conference of "Era of Decision—Property Tax Issues in the '70's," sponsored by the Southern Land Economics Research Committee and the Southern Work Group on Real Property Taxation, May 24, 1973.

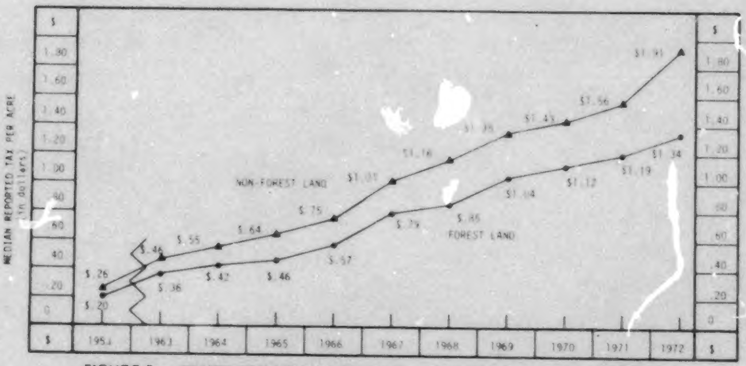

FIGURE 5 — STATEWIDE MEDIAN REPORTED TAX PER ACRE (1953 - 1972)

Some states classify crop, forest, and pasture land in lower tax-assessment categories. Nine states provide for the assessment of farm and forest lands at their current-use value. Some states require zoning of areas designated for agricultural use-value assessment, while others provide for voluntary agreements between landowners and state or local government. Under contract provisions, the landowner agrees to keep his land in specified usage—i.e., agricultural, open-space, or forest—in return for special use-value tax assessment.[3]

Much of the rationale for use-value assessment stems from the effects of so-called "urban-sprawl" into the country-side surrounding metropolitan areas. People whose livelihood depends upon farming or forestry—enterprises typically characterized by high costs, high risks, and low profit margins—find themselves faced with rapidly rising taxes as assessors equate values of such land with that in nearby subdivisions and other developments. Most local governments recognize the plight of the rural landowner, but spiraling costs of providing additional schools, roads, and other public services have necessitated revenue requirements which prevent more equitable treatment.

Extensive research and analysis have suggested that land valuation is at the heart of Georgia's ad valorem tax crisis. Instead of the present valuation concept of "fair market value" (based upon the amount of money for which other land of supposedly "comparable" worth has been recently sold), *present use* would appear to be a more rational basis for determining what tax burden our valuable agricultural and forested lands should bear. Of the many variations of use-value assessment, the approach deemed most operationally feasible and practicable would be one by which rural land is appraised on the basis of its productivity—that is, its potential for producing farm and forest crops. Such a system of valuation would enable statewide equalization of rural property values and provide stable revenues to the county treasury.

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[3] See footnote, p. 97.

FARMING IN THE CITY'S SHADOW

HUMAN CONSIDERATIONS IN LAND USE

FARMING IN THE CITY'S SHADOW

URBANIZATION OF LAND AND CHANGES IN FARM OUTPUT IN STANDARD METROPOLITAN STATISTICAL AREAS, 1960-70

[By Robert C. Otte*]

INTRODUCTION

Throughout U.S. history the percentage of population living and working in urban areas has been increasing. In recent years, the amount of land used per capita for residential, industrial, commercial, and transportation purposes has also increased. These changes add up to a sizable continuing demand for land for urban use.

This report examines population increases and changes in distribution and the attendant land use changes between publication of the latest two Censuses of Population.[1] It also appraises the nature and extent of agricultural resources and agricultural activity in urbanizing areas of changes that occurred between 1960 and 1970.

POPULATION DISTRIBUTION

For many years, the U.S. population increasingly became dispersed as new land was settled and brought into production. However, the recent trend has been toward greater population concentration. In 1950, 5 percent of the U.S. counties had nearly 57 percent of the population; by 1970, their share had risen to about 61 percent. The Gini ratio, an index of concentration, increased from .769 to .802 (table 1).

Population increases and decreases from 1960 to 1970, county by county, also indicate increasing population concentration. During that period, population increased in 1,744 counties and decreased in 1,372 counties. The net population increase of the 48 contiguous states was 23.7 million people. But, expanding areas, comprising 56 percent of the counties, had to accommodate more than 26 million additional people (table 2).

Intercounty population shifts were greatest in the Northern Plains (fig. 1). From 1960 to 1970, the population in 77 of the region's counties increased by 347,000; in 242 counties, it decreased 236,000. Some states had particularly dramatic intercounty shifts. North Dakota had a net loss of 10,000 people, but seven of its counties gained a total of 43,000. In Mississippi, 33 counties gained 144,000 people and the other 49 counties lost 105,000—for a net gain of 39,000.

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[1] Department of Commerce, Bureau of the Census. Censuses of Population, 1960 and 1970.

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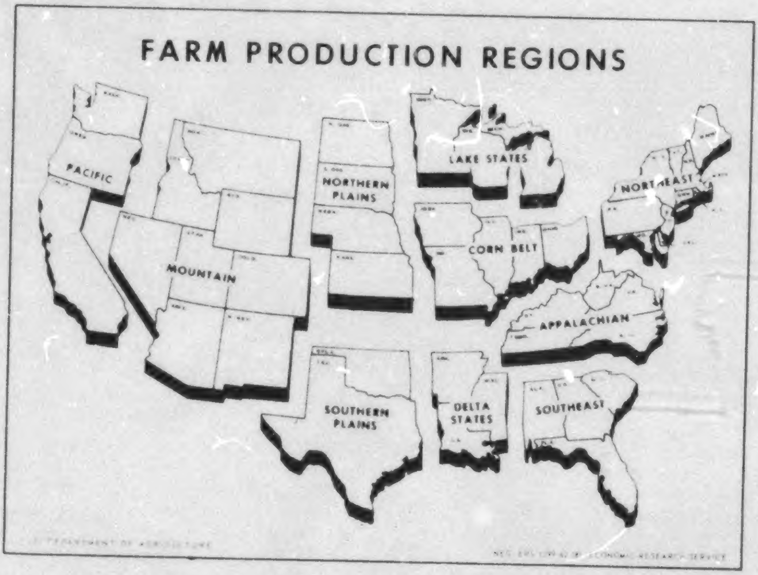

FIGURE 1

TABLE 1.—CONCENTRATION OF POPULATION IN THE 48 CONTIGUOUS STATES, 1950–70

Item [1]	1950	1960	1970
	Percent of population		
Proportion of counties:			
Top 1 percent	35.6	35.5	34.9
Top 5 percent	56.8	59.1	60.8
Top 10 percent	67.2	70.2	71.8
Top 25 percent	82.8	84.9	86.3
Top 50 percent	95.3	95.8	96.3
	Gini ratio [2]		
Population concentration	.769	.789	.802
	Millions		
Total population	150.6	178.5	202.1

[1] 3,117, including independent cities.
[2] Zero would mean equal distribution. Unity would be maximum concentration or inequality.

Source: Rural Development. President's Annual Report to the Congress on Government Services to Rural America: p. 9. April 1972.

About 70 percent of the U.S. population resides within the Standard Metropolitan Statistical Areas[2] designated by the Bureau of the Census (fig. 2). These same areas had 67 percent of the population in 1960 (although many of the areas were not designated as SMSA's at that time). This increased share also reflects the movement toward greater concentrations of population (table 3).

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[2] An SMSA is a group of counties defined as an entire area in or around a city or community of at least 50,000 people in which activities form an integrated economic and social system. In 1970, there were 242 SMSA's in the 48 contiguous states and 1 in Hawaii. The mainland SMSA's comprised 459 counties. In this study, data were developed for both 1960 and 1970 for the area (459 counties) that was within SMSA's designated in 1970.

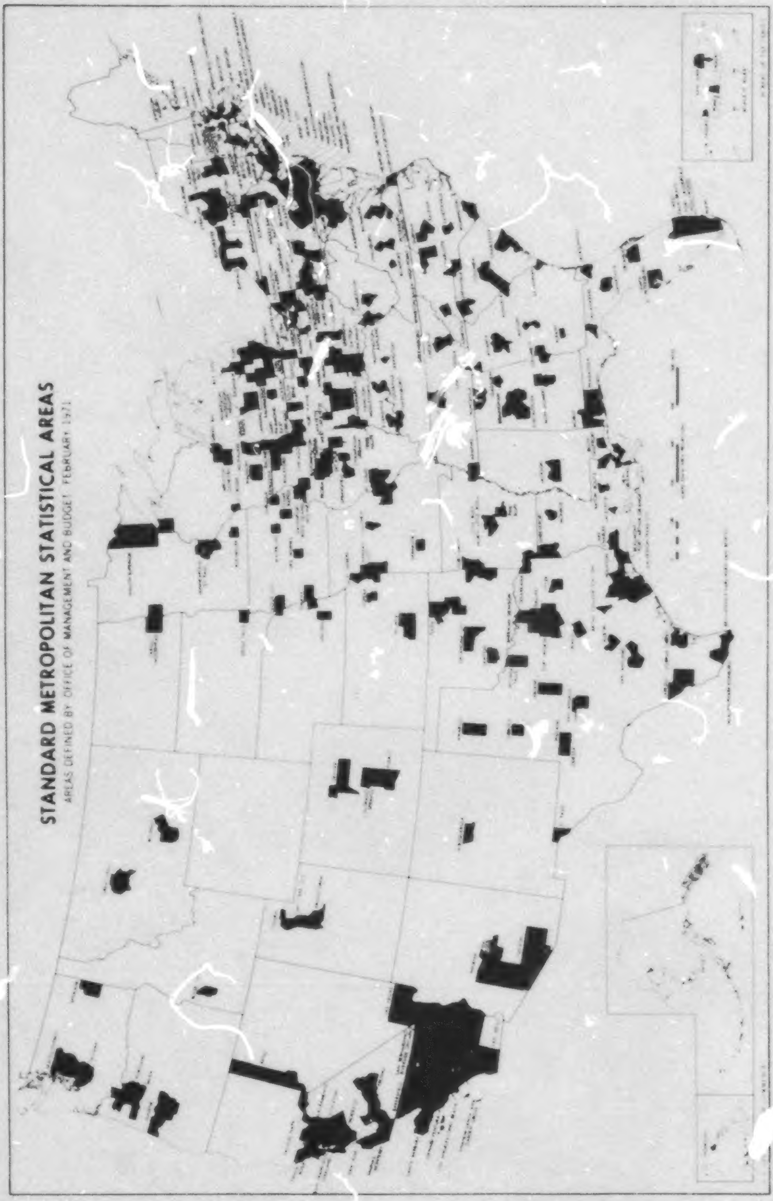
STANDARD METROPOLITAN STATISTICAL AREAS
AREAS DEFINED BY OFFICE OF MANAGEMENT AND BUDGET FEBRUARY 1971

FIGURE 2

TABLE 2.—POPULATION CHANGES, BY REGION, 1960–70

Region[1]	Total population (thousands)		Counties showing population				Net population increase (thousands)
			Increase		Decrease		
	1970	1960	Counties	Population (thousands)	Counties	Population (thousands)	
Northeast	54, 268	48, 988	199	5, 790	46	510	5, 280
Lake	17, 098	15, 189	166	1, 998	76	89	1, 909
Corn Belt	34, 461	31, 527	284	3, 293	212	359	2, 934
Northern Plains	5, 014	4, 903	77	347	242	236	111
Appalachian	18, 617	16, 988	291	1, 977	218	348	1, 629
Southeast	17, 414	14, 545	212	3, 007	127	138	2, 869
Delta	7, 781	7, 221	124	770	97	210	560
Southern Plains	13, 756	11, 908	146	2, 118	185	270	1, 848
Mountain	8, 281	6, 855	139	1, 578	142	152	1, 426
Pacific	25, 453	20, 339	106	5, 169	27	55	5, 114
48 contiguous States	202, 143	178, 463	1, 744	26, 047	1, 372	2, 367	23, 680

[1] See fig. 1.

Source of data: Department of Commerce, Bureau of the Census Censuses of Population.

TABLE 3.—POPULATION IN SMSA COUNTIES

[In percent]

Region	Population in SMSA's[1]	
	1970	1960
Northeast	80. 4	80. 8
Lake	67. 3	67. 6
Corn Belt	70. 8	69. 5
Northern Plains	34. 9	31. 6
Appalachian	45. 5	42. 2
Southeast	56. 0	52. 6
Delta	38. 3	37. 2
Southern Plains	69. 2	65. 1
Mountain	56. 9	49. 2
Pacific	86. 6	85. 2
48 contiguous States	69. 7	66. 8

[1] Counties designated SMSA's as of 1970.

Source: Department of Commerce, Bureau of the Census, censuses of population.

Over 80 percent of the U.S. population increase between 1960 and 1970 occurred within the SMSA's. The increase varied among regions. In the Delta region, SMSA's accounted for only a little over 50 percent of the population increase. In the Northern Plains, where many local areas were losing population, the SMSA increase was almost double the net increase for the entire four-state region (table 4)

POPULATION DENSITIES

Overall, average population density for the 48 contiguous states was 67 persons per square mile in 1970—up from 60 in 1960. Practically all of the increase was accounted for by the SMSA's, where density increased from 302 to 355 people per square mile. Density of non-SMSA counties barely increased, from 23 to 24. Densities of SMSA's varied considerably among regions, ranging from 90 people per square mile in the Mountain region to 833 in the Northeast (table 5). This is largely due to the fact that, except in New England, SMSA's are drawn along county lines. In the Mountain and Pacific regions, many SMSA's comprise very large counties and include more rural land than is contained in Eastern SMSA's.

TABLE 4.—DISTRIBUTION OF POPULATION INCREASES, 1960–70

[In percent]

Region	Regional distribution: Total increase	Regional distribution: SMSA increase	SMSA share of total increase
Northeast	22.3	20.6	76.1
Lake	8.1	6.4	64.9
Corn Belt	12.4	12.7	84.5
Northern Plains	.5	1.1	184.7
Appalachian	6.9	6.8	81.0
Southeast	12.1	10.8	73.4
Delta	2.4	1.5	53.2
Southern Plains	7.8	9.0	95.2
Mountain	6.0	6.9	94.0
Pacific	21.5	24.2	92.1
48 contiguous States	100.0	100.0	82.2

Source: Department of Commerce, Bureau of the Census, censuses of population.

TABLE 5.—POPULATION DENSITIES, SMSA AND NON-SMSA COUNTIES, 1970

Region	Population per square mile: SMSA counties	Population per square mile: Non-SMSA counties	Population per square mile: All counties
Northeast	833	86	305
Lake	395	34	88
Corn Belt	515	48	132
Northern Plains	223	11	16
Appalachian	400	59	94
Southeast	293	47	88
Delta	220	36	53
Southern Plains	194	15	41
Mountain	90	4	10
Pacific	247	15	78
48 contiguous States	355	24	67

Source: Department of Commerce, Bureau of the Census, census of population.

The San Bernardino-Riverside-Ontario SMSA in California contains San Bernardino County, which covers 20,000 square miles. Maricopa County, Arizona (Phoenix), covers over 9,000 square miles. Many Eastern counties are less than 500 square miles in size.

There is less variation in density among the urban parts of SMSA's.[3] These urban areas, which comprise an average of only 10 percent of the SMSA's, had an average density of 3,100 persons per square mile, varying from 4,100 in the Northeast to 2,000 in the Southern Plains (table 6).

Population densities in the urban parts of SMSA's decreased appreciably between 1960 and 1970 for several reasons. First, populations of most of the central cities decreased. For example, San Francisco, Washington, Minneapolis, and New Orleans lost population. Second, the land taken into urban areas since 1960 is less densely populated than the older areas. There are more single-family houses and fewer high-rise apartments. And, there is a higher percentage of underdeveloped land. Third, the census apparently was more liberal in delineating urbanized areas and urban places in 1970.

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[3] Comprised of "Urbanized area" as delineated by the Census, plus additional "urban places" of over 2,500 population (see under next section).

TABLE 6.—POPULATION DENSITIES, URBAN AND RURAL PARTS OF SMSA's 1960-70

[Population per square mile]

Region	SMSA counties				Non-SMSA counties	
	Urban part		Rural part			
	1960	1970	1960	1970	1960	1970
Northeast	4,389	4,101	114	67	76	86
Lake	3,125	2,994	68	43	30	34
Corn Belt	4,614	3,240	77	89	46	48
Northern Plains	3,911	2,990	28	26	11	11
Appalachian	3,162	2,496	87	74	58	59
Southeast	2,876	2,362	50	44	43	47
Delta	2,897	2,564	54	41	34	36
Southern Plains	2,242	2,024	21	43	15	15
Mountain	2,902	2,529	7	8	4	4
Pacific	3,652	3,491	26	19	13	15
48 contiguous States	3,572	3,137	49	42	23	24

Source of data: Department of Commerce, Bureau of the Census. Censuses of Population.

The latter point also explains the seemingly anomalous finding that population density has increased in the SMSA's as a whole, while it has declined in both the urban and nonurban parts. The size of the urban part has increased more rapidly than population, thus reducing its density. In the process, the higher density portions of the 1960 nonurban part had been incorporated into the urban part by 1970, thus slightly reducing the average density.

LAND USE IN SMSA'S

The Census of Population provides the only nationwide statistics on the area of land in urban use. The census identifies "urbanized areas" and "places," and quantifies population and area. The Census Bureau's major objective in delineating urbanized areas is to enable separation of urban and rural populations near the larger cities. An urbanized area consists of a central city or contiguous cities with a population of 50,000 or more, plus surrounding closely settled territory. Urbanized areas are generally within SMSA's.[4]

Also, the Census Bureau identifies and compiles data by places, both incorporated and unincorporated. Incorporated places are usually cities, boroughs, towns, and villages. Unincorporated places are closely settled population centers without corporate limits. The census provides area data for all places with 2,500 or more population.[5]

For this report, land in urban use is identified as the urbanized area within an SMSA, plus any place of 2,500 or more population lying within the SMSA but outside the designated urbanized area. This designation omits settlements with less than 2,500 population, as well as some scattered factories, businesses, and residences. However, rural and even agricultural land lies within the boundaries of urbanized areas and places. These discrepancies tend to offset each other.

By the above definition of land in urban use, 10 percent of the total land area in SMSA's was urban in 1970. This percent varied regionally from almost 20 percent in the Northeast to a little over 3 percent in the Mountain region. The total urban area within SMSA's increased from 18 million acres in 1960 to 25 million acres in 1970. Nearly one-third of an acre was added to the urban area for each person added to the population in the 242 SMSA's in the 48 contiguous states, as designated in 1970. Per capita acreage rates were lowest in the Northeast and Pacific regions—about one-fifth of an acre per capita—and were highest in the Northern Plains—over half an acre per capita (table 7.)

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[4] Department of Commerce, Bureau of the Census. Census of Population: Number of Inhabitants—U.S. Summary PC(1)-A1: pp. XII-XIII. Dec. 1971.

[5] Ibid. p. XI.

Probably over half of this urbanized land was previously cropland, although the share varies by region. One study reports that 76 percent of land urbanized in the West had been cropland.[6] In the Northeast the figure was 49 percent,[7] and, in the Delta region, it was 54 percent.[8] Thus within SMSA's during the 1960's, about one-fifth of an acre of cropland per capita was converted to urban use (table 7).

TABLE 7.—INCREASE IN URBAN LAND WITHIN SMSA'S, AND AREA ADDED PER CAPITA 1960-70

Region	Area increase	
	Total [1] (thousand acres)	Per capita (acres)
Northeast	1,127	0.21
Lake	571	.36
Corn Belt	1,248	.46
Northern Plains	115	.52
Appalachian	683	.45
Southeast	894	.41
Delta	166	.38
Southern Plains	869	.43
Mountain	430	.33
Pacific	1,092	.21
48 States	7,096	.32

[1] Includes "urbanized areas," plus any additional area in "places" over 2,500 population.

Source of data: Department of Commerce, Bureau of the Census. Censuses of Population.

The average SMSA comprised slightly over 1 million acres in 1970: 10 percent was in urban uses, 24 percent cropland, 19 percent pasture and range, 32 percent woodland, and 15 percent was used for miscellaneous purposes (table 8).

In 1970, the average size of SMSA's ranged from 614,000 acres in the Northeast to 2.6 million acres in the Pacific region, reflecting generally the size of counties.[9] Size of SMSA's increased as one moves westward. Average size of the urban part varied less and was largest in regions with the larger cities. SMSA's were smallest in the Northern Plains, where cities are generally smaller (table 9).

Land use in the nonurban parts of SMSA's varies by region (table 8). SMSA's in the Appalachian, Southeast, and Delta regions were more than half woodland in 1970. The Lake and Pacific regions were each over one-third woodland. The Northeast approached 50 percent. This region—the most populous in the country, with 80 percent of its population within SMSA's—had over 15 million acres of woodland in these areas.

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[6] Dill, Henry W., Jr., and Otte, Robert C. Urbanization of Land in the Western States. USDA, ERS-428: p. 6. 1970.

[7] Dill, Henry W., Jr., and Otte, Robert C. Urbanization of Land in the Northeastern United States USDA, ERS-485 p. 4. 1971.

[8] Frey, H. Thomas. Land Use Change in the Southern Mississippi Alluvial Valley. 1950-69. USDA, AER-215: p. 6. 1971.

[9] Size is, to a degree, arbitrary. Some SMSA's abut and could be merged.

TABLE 8.—LAND USE WITHIN SMSA's, 1970 [1]

Region	Total SMSA area		Urban part		Rural part									
					Total rural		Cropland		Pasture-range		Forest woodland		Other	
	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent
Northeast	33,004	100	6,238	18.9	26,766	81.1	7,213	21.9	1,877	5.7	15,457	46.8	2,219	6.7
Lake	18,669	100	2,308	12.4	16,361	87.6	8,065	43.2	753	4.0	6,307	33.8	1,236	6.6
Corn Belt	30,916	100	4,207	13.6	26,709	86.4	15,683	50.7	2,494	8.1	4,228	13.7	4,304	13.9
Northern Plains	5,031	100	334	6.6	4,697	93.4	3,121	62.2	1,037	20.6	175	3.5	364	7.2
Appalachian	13,935	100	1,782	12.7	12,152	87.3	2,798	20.1	1,267	9.8	7,713	55.4	274	2.0
Southeast	21,070	100	2,257	10.7	18,813	89.3	2,993	14.2	1,816	8.6	12,301	58.4	1,703	8.1
Delta	8,415	100	612	7.3	7,803	92.7	1,696	20.2	908	10.8	4,513	53.6	686	8.2
Southern Plains	31,003	100	2,717	8.8	28,286	91.2	8,339	26.9	13,535	43.7	5,093	16.4	1,319	4.2
Mountain	33,279	100	1,088	3.3	32,191	96.7	3,031	9.1	13,631	41.0	4,797	14.4	10,732	[3] 32.2
Pacific	57,320	100	3,738	6.5	53,582	93.5	7,467	13.0	10,434	18.2	20,679	36.1	15,002	26.2
48 contiguous States	252,642	100	25,282	[2] 10.0	227,360	90.0	60,406	23.9	47,852	18.9	81,263	32.2	37,839	15.0

[1] 242 SMSA's.

[2] Includes "urbanized area" plus additional land in "urban places over 2,500 population."

[3] Includes some Federal land used as range.

Source of data: Department of Commerce, 1970 Census of Population, and 1967 Conservation Needs Inventory.

SMSA's in the Northern Plains and the Corn Belt were over half cropland. In the Lake region, the share was two-fifths. Pasture plus open land (including mountains, deserts, and wastelands) occupied about three-fourths of the Southern Plains and Pacific regions. Figure 3 shows graphically the relative size and distribution of land use within average SMSA's in each of the 10 farm production regions.

Though large acreages of cropland, grassland, and woodland remain fairly close to most central cities, many urban residents do not have ready access to these areas. In many situations, small acreages could help break up unrelieved concentrations of buildings, provide buffers between different land uses, and improve air and water quality. The problem is not an overall lack of open space, but its lack in specific locations where it is badly needed.

LAND RESOURCES

Overall, about 13 percent of the land area of the 48 contiguous states is within SMSA's. The share in the Northeast region is 30 percent and in the Pacific region, 27 percent. In the Northern Plains, less than 3 percent of the land area is within SMSA's. Generally, the percentage of farm units in SMSA's is higher and the percentage of land in farms is lower than the percentage of land area, reflecting a small average size of farm in these more urban counties.

TABLE 9.—LAND USE WITHIN AN AVERAGE SMSA, 1970

[In thousands of acres]

Region	Average size SMSA [1]	Urban part [2]	Rural part				
			Total rural	Cropland	Pasture-range [3]	Forest woodland	Other
Northeast	614	116	498	134	35	288	41
Lake	911	113	798	393	37	308	60
Corn Belt	763	104	659	387	62	104	106
Northern Plains	868	58	810	538	179	30	63
Appalachian	596	76	520	120	58	330	12
Southeast	874	94	780	124	75	510	71
Delta	679	50	629	137	73	364	55
Southern Plains	1,211	106	1,105	326	529	199	51
Mountain	2,377	78	2,299	216	974	343	[3] 766
Pacific	2,605	170	2,435	339	474	940	682
48 contiguous States	1,044	104	940	250	198	336	156

[1] 242 SMSA's.

[2] Includes "urbanized area," plus additional land in "places over 2,500 population."

[3] Includes some Federal land used as range.

Source of Data: Department of Commerce. 1970 Census of Population and 1967 Conservation Needs Inventory.

Cropland harvested in SMSA's is about proportional to the share of total U.S. land area—that is, 14 percent. SMSA's had a fairly large share of each region's irrigated cropland, particularly in the Northeast, Southeast, and Pacific regions. In the Northeast, this situation probably reflects the concentration of irrigated fruit and vegetable crops in or near population areas. Also, the large counties in the Pacific region encompass more agricultural land than do those in other regions.

FIGURE 3

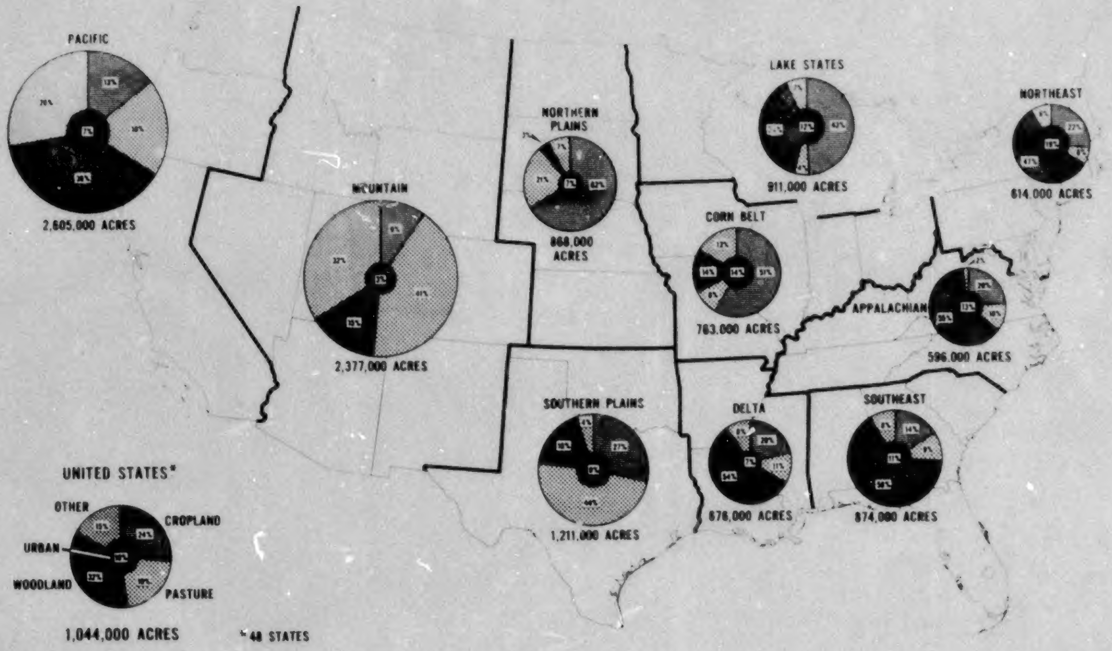

Figure 3. Average size SMSA by region: Distribution of land use, 1970

Between 1959 and 1969, the SMSA share of U.S. farms and irrigated land decreased slightly, while the share of cropland harvested increased slightly. The SMSA share of irrigated land decreased considerably in the Northeast, Lake, and Corn Belt regions—particularly in the latter. This was not due to decreases in irrigated acreage within SMSA's, but rather to increases outside SMSA's. On the other hand, the percentage of SMSA irrigated land increased in the Pacific region, where most of the urban development was at the expense of this land (table 10). Apparently, newly irrigated land offset the loss to urbanization. Irrigated land in Pacific region SMSA's increased from 3.8 million acres in 1959 to 4.0 million acres in 1969.

Even though it appears drastic when viewed in specific local situations, the overall taking of land each year for urban uses has had minimal effect on the supply of cropland. Four or five times the quantity of cropland taken for urban uses is shifted to lower intensity agricultural or forestry uses or is idled each year because it has become uneconomic to continue cropping it. About three times the quantity of land urbanized each year is added to the cropland base through irrigation, drainage, and clearing.[10]

TABLE 10.—FARMLAND AND FARMS IN SMSA's, 1959 AND 1969

[In percent]

Region	Total land area	Number of farms		Land in farms		Cropland harvested		Irrigated land in farms	
		1959	1969	1959	1969	1959	1969	1959	1969
Northeast	30.3	41.5	41.7	33.1	33.7	38.0	37.9	71.0	64.6
Lake	13.2	15.9	17.6	12.0	12.2	12.6	14.2	21.9	16.2
Corn Belt	18.1	19.4	19.4	16.2	16.1	17.9	18.9	25.7	12.0
Northern Plains	2.6	5.1	4.9	2.5	2.4	3.7	3.6	.5	.5
Appalachian	10.5	9.8	10.2	9.1	9.4	9.7	10.7	15.1	14.5
Southeast	16.7	15.0	14.4	13.0	12.1	13.4	15.6	35.1	32.9
Delta	9.2	7.7	7.4	8.2	8.2	8.0	7.2	10.8	8.4
Southern Plains	14.5	20.3	19.9	14.7	13.3	18.9	18.7	22.9	18.8
Mountain	6.1	12.5	11.8	7.1	6.0	7.8	7.2	9.9	8.5
Pacific	27.1	43.5	47.7	25.7	29.2	32.9	34.0	39.5	40.3
48 contiguous States	13.0	17.6	17.2	11.6	11.1	14.0	14.4	21.0	18.9

Source of data: Department of Commerce, Bureau of the Census, Censuses of Agriculture.

The SMSA's overall, and in each region, have slightly more than their proportionate share of the better agricultural land—that is, land in land capability classes I, II, and III.[11] Fifteen percent of this land is in the 13 percent of the total land area comprising the SMSA's (table 11). This could be expected, of course, since many cities owe their location to accessibility to water and rail transportation. Also, many originated as trade centers serving agricultural communities. Such places generally have more land with even terrain. Also, much of the land in classes VI to VIII lies in rough areas whose terrain is unsuitable for urban development.

The Federal Government—principally the Bureau of Land Management, the Forest Service, and the National Park Service—holds approximately 400 million acres in the 48 contiguous states (table 12). Most of this land is in the West—268 million acres in the Mountain region and 90 million in the Pacific region. Overall, about 10 percent of the Federal land is within SMSA's. SMSA's of the Pacific region have almost 23 million acres of Federal land; those in the Mountain region have 13 million acres; the Southeast has almost 2 million acres; and the Southern Plains and Lake States have less than 1 million acres each.

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[10] Krause, Orville E. Cropland Trends since World War II. USDA, AER-177: p. 6. 1970.

[11] The Soil Conservation Service, U.S. Department of Agriculture, classifies soils into 8 land capability classes that indicate the degree of soil limitation for growing field crops. Under this system, soils in classes I, II, and III are suitable for regular cultivation of most field crops and for a wide range of other uses. See Klingebiel, A. A., and Montgomery, P. H., Land-Capability Classification. Soil Conservation Service, USDA, AH-210. 1970.

AGRICULTURAL PRODUCTION IN SMSA'S

Overall, the SMSA share of U.S. agricultural production appears to have decreased slightly during the 1960's. In 1959, SMSA's provided 22.6 percent of the total value of farm products sold in the 48 contiguous states (table 13). In 1969, the share dropped to 21.5 percent. This pattern held generally for the country, and most of the individual regions also showed small decreases. The greatest change was in the Pacific region, where production increased. That region's SMSA share of production increased from 50.1 to 55.8 percent. This is consistent with the Pacific region's increases in the SMSA share of farms, land in farms, cropland harvested, and irrigated land in farms (see table 10). Expansion of irrigation in rural areas of Pacific SMSA counties appears to be the cause.

TABLE 11.—QUALITY OF LAND RESOURCES WITHIN SMSA's

[In percent]

Region	Acreage within SMSA's	
	Total land area	Land capability classes I-III [1]
Northeast	30.3	33.7
Lake	13.2	14.3
Corn Belt	18.0	19.1
Northern Plains	2.6	3.3
Appalachian	10.5	11.9
Southeast	16.7	19.0
Delta	9.2	9.3
Southern Plains	14.5	16.9
Mountain	6.1	7.5
Pacific	27.1	32.7
48 contiguous States	13.0	15.0

[1] Department of Agriculture, 1967 conservation needs inventory.

TABLE 12.—FEDERALLY OWNED LAND IN SMSA's [1]

[In thousands of acres]

Region	SMSA counties	Total region
Northeast	306	2,269
Lake	837	7,548
Corn Belt	220	2,782
Northern	20	6,187
Appalachian	447	7,350
Southeast	1,811	6,625
Delta	356	5,339
Southern Plains	910	3,481
Mountain	13,215	267,625
Pacific	22,935	89,919
48 contiguous States	41,057	399,125

[1] Source of data for Federal noncropland, Department of Agriculture. 1967 conservation needs inventory.

TABLE 13.—SMSA SHARE OF TOTAL VALUE OF U.S. FARM PRODUCTS SOLD, 1959, 1964, AND 1969

[In percent]

Region	SMSA share of U.S. production, by value		
	1959	1964	1969
Northeast	45.3	43.5	43.5
Lake	15.0	15.0	16.7
Corn Belt	19.3	19.2	18.3
Northern Plains	5.8	6.0	5.7
Appalachian	10.8	10.6	11.8
Southeast	21.3	21.4	19.0
Delta	8.6	7.8	7.5
Southern Plains	22.7	22.1	18.9
Mountain	17.0	18.2	15.2
Pacific	50.1	51.6	55.8
48 contiguous States	22.6	22.8	21.5

Eight U.S. crops have an annual value of more than $1.5 million each. These are corn, hay, soybeans, fruits and nuts, wheat, commercial vegetables, tobacco, and cotton.[12] In 1972 the value of these commodities totaled over $27 billion, accounting for more than 80 percent of the value of the major crops for which the Statistical Reporting Service compiles estimates.[13]

The SMSA share of production of six of these crops was higher than the SMSA share of total land area or of total cropland harvested. For the United States as a whole, SMSA's accounted for about 14 percent of all cropland harvested in 1969. The SMSA share of output compared to its land area or cropland share, was lower for only tobacco and wheat. Vegetable production, especially, was concentrated near population centers. About 60 percent of all vegetables sold in 1969 came from SMSA's as did 43 percent of the fruits and nuts.

From 1959 to 1969, SMSA's increased their share of four major crops—corn, fruits and nuts, vegetables, and cotton. They experienced a decrease in their share of the other four major crops—hay, soybeans, wheat, and tobacco. All told, increasing population and urbanization seem to have had only minimal impact on total agricultural production in the SMSA's.

Agricultural and nonagricultural uses of land on the rural-urban fringe sometimes complement and sometimes compete with one another. Some types of agricultural production tend to be carried out near centers of population. This is particularly true of bulky or perishable products that have few climatic or soil constraints, such as temperate climate fruits and vegetables. When fruit and vegetable farms are sold for nonagricultural uses, the operator often moves just a little farther out and resumes production. Thus, fruit and vegetable production tends to remain concentrated in urban areas even as cities expand.

Corn, soybeans, wheat, cotton, tobacco, other field crops, and subtropical fruits are produced in specific areas because soils and climate give them an economic advantage. Proximity of population concentrations to provide a market is not a factor. When land producing one of these crops is urbanized, production moves to other land adapted to that crop. Nevertheless, census statistics show an

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[12] The categories fruits and nuts and vegetables each consist of a number of individual crops.

[13] Statistical Reporting Service, USDA. Crop Values: 1970, 1971, and 1972. Cr. Pr. 2-1-1 (73): pp. 3-6. Jan. 1973.

TABLE 14.—SMSA SHARE OF PRODUCTION OF 8 MOST VALUABLE U.S. CROPS, 1959 AND 1969

[In percent]

Crop and year	SMSA share of U.S. production, by quantity										
	Northeast	Lake	Corn belt	Northern Plains	Appalachian	Southeast	Delta	Southern Plains	Mountain	Pacific	48 contiguous States
Corn:											
1959	47.4	12.3	18.3	6.4	7.3	10.4	5.4	22.0	7.2	42.8	15.8
1969	43.5	13.1	19.6	5.0	10.6	8.1	4.4	11.5	5.6	56.7	16.8
Hay:											
1959	35.8	13.3	17.2	3.9	10.5	19.5	10.2	23.0	9.8	35.5	17.0
1969	34.6	15.5	15.9	3.3	10.0	16.9	11.2	19.1	8.6	36.0	16.2
Soybeans:											
1959	10.0	11.0	19.3	11.4	11.2	30.2	7.5	19.9			16.2
1969	18.3	10.3	18.7	9.4	12.5	21.2	6.1	19.8	3.8	43.5	15.4
Fruits and nuts:											
1959	62.6	16.6	28.5	19.9	6.7	26.9	9.3	65.5	32.4	54.5	43.2
1964 [1]	63.8	17.9	30.0	15.4	7.0	27.8	9.6	40.4	37.0	52.9	43.4
Wheat:											
1959	51.0	27.3	23.2	3.5	12.6	16.8	10.4	9.9	8.2	9.5	11.2
1969	50.7	23.1	23.4	2.8	15.8	24.5	12.5	9.4	6.0	11.9	9.1
Vegetables:											
1959	67.7	32.4	42.4	42.1	14.6	61.2	17.9	50.7	42.7	68.9	58.3
1964 [1]	65.2	34.1	40.5	47.1	12.8	66.5	19.4	46.8	44.1	70.7	59.6
Tobacco:											
1959	76.1	33.0	29.0		8.0	.8					11.7
1969	71.8	41.6	27.1		9.0	1.1					10.9
Cotton:											
1959					7.0	12.4	8.9	25.1	31.5	56.4	21.9
1969					6.2	15.3	8.1	25.8	35.1	58.0	22.3

[1] No comparable data available for 1969.

Source: Department of Commerce, Bureau of the Census. Censuses of agriculture.

increase in the percentage of corn and cotton produced in SMSA's from 1959 to 1969.

The steadily increasing yield per acre is probably the main reason that loss of cropland to urban uses has had so little apparent effect on agricultural production. In the early 1950's, almost 2 acres of cropland were used per capita to supply domestic needs. By the 1970's this had dropped to less than 1¼ acres per capita.[14] As long as such gains in agricultural productivity continue, land needed for living, working, and recreation for an increasing population, even at higher per capita rates of use, can probably be provided with minimum total impact on U.S. agricultural production and consumption.

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[14] Economic Research Service. Changes in Farm Production Efficiency. USDA, SB-233: p. 7. 1972.

HUMAN CONSIDERATIONS IN LAND USE

[By Robert C. Otte*[1]]

In this paper I plan to interpret the term, "human considerations," fairly broadly, albeit bracketed by Dr. Vlasin's topic of national economic considerations and Mr. Johnson's topic of natural resources. Thus, I will steer clear of economic considerations, *per se*, on the one hand and physical characteristics of land and related resources on the other. I will look at the human needs that manifest themselves in land use, garner some of the sparse quantifications available on the overall land use situation, and review some of the more apparent areas of emerging land use conflicts. I will concentrate on the national and regional picture and on aggregates because I feel this is the place to start and also because this is the level at which the Economic Research Service has been most involved.

The most obvious human needs for land are for food and fiber, living space, industrial and commercial activity, transportation facilities, and recreation. Intertwined with these categories but worthy of some separate consideration are land uses involved in production and consumption of energy and those involved in disposal of solid wastes. I will look at these land uses separately and as they relate to each other.

THE OVERALL LAND USE PATTERN

Demands on our land resources have been increasing. Between 1950 and 1970, our population increased by one-third. Diets improved. The number of housing units increased by almost 50 percent. In constant dollars, the Gross National Product more than doubled. Some 30,000 miles of new, multilane interstate highway were built and many older highways were widened.

Yet the overall land use pattern has not changed greatly. Cropland takes about one-fifth, permanent pasture and range about one-fourth, forest land about one-third, and wasteland one-eighth of total land area, almost the same as in 1950. Land in urban areas increased by over one-half but still takes only about 1.5 percent of the total land. Highways take only 1 percent. Substantial acreages have been reserved for recreation or wildlife, but this has usually meant no substantive change in land use. (Fig. 1.)

And, in the aggregate, current projections do not indicate shortages of land or serious competition among uses in the foreseeable future. Another 100 million people can likely be provided for with our current cropland base—and possibilities exist for expansion of cropland acreages. Another 100 million people would need possibly 35 million additional acres for urban uses—double the acreage now in such uses

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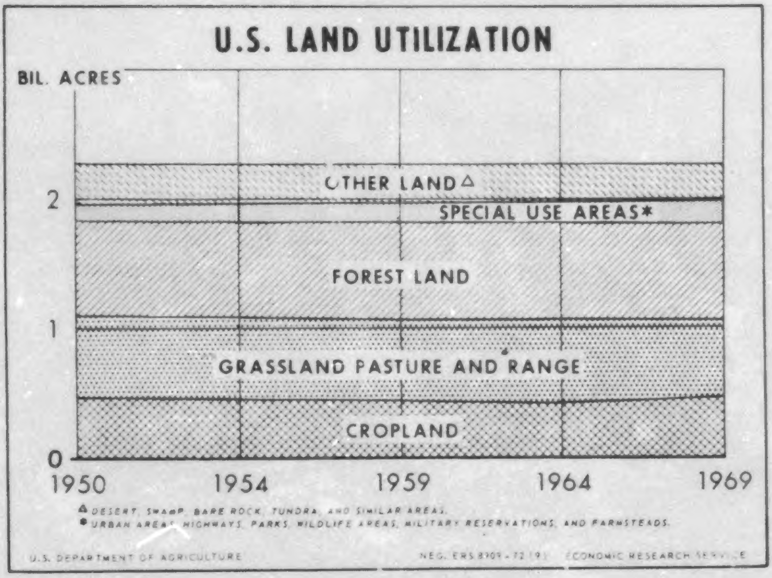
*Agricultural Economist, Natural Resource Economics Division, Economic Research Service. Paper prepared for presentation at the National Land Use Policy Conference, Des Moines, Iowa, Nov. 27-29, 1972.

[1] I am particularly indebted to my colleagues, H. Thomas Frey, Orville E. Krause, and John F. Fritschen, from whose data and writing I have borrowed freely.

FIGURE 1



but still only about 3 percent of our land area. When we get down to specifics, however—specific crops, specific non-agricultural uses, specific localities, specific pieces of land—the competition and conflict are often very intense and will most likely get more intense.

CROPLAND

Between 1950 and 1970, crop production increased by over one-half. Total farm output capita increased by 6 percent. In recent years, food production has more than kept up with population increases, while the acreage used for crops has decreased. Output per acre has increased by about 2 percent per year. U.S. population is currently increasing at an annual rate of 1 percent or less.

In addition to domestic needs for food and fiber is foreign demand. Acreages used to produce commodities for export have varied over the past 20 years—from a low of 31 million acres in 1953, to a high of 77 million acres in 1963. In Fiscal Year 1972, a record $8 billion in exports took the equivalent of 65 million acres (a little over 20 percent of acreage of crops harvested). With crop yields increasing, exports can expand without substantially straining our production capacity.

Cropland used for crop production has declined since about 1950. Total land classed as cropland also decreased through most of the period but somewhat more slowly, as substantial acreages of cropland have been idled annually since 1956 under supply management programs. Between 1945 and 1964, an average of over 2.5 million acres annually dropped out of the Census cropland category. However, about 1 acre of new cropland was developed for each 2 acres shifted to other uses, reducing the net loss to about 1.4 million acres per year.[2]

New cropland was developed in several well-defined areas. Reclamation in Florida was associated largely with combination drainage-irrigation projects, in the Delta with drainage and clearing, and in the Texas High Plains, California, and Washington with expanded irrigation facilities. Cropland acreage was expanded by improved dryland farming techniques in Northern Montana and by small-scale drainage and conversion of pasture throughout the Corn Belt. Much of this new cropland is more productive than that abandoned.

Abandonment of cropland and shifts to other uses occurred mainly in the Southeastern States, excluding the Delta and Southern Florida. Cropland has been converted to grass or forest, or abandoned, mainly because of low fertility and features of the terrain not adapted to efficient use of modern machinery.[3]

Higher crop yields have been in part the result of increased use of commercial fertilizers, pesticides, and other chemicals. Future increases of 2 percent per year would depend to a degree on continuing increases in use of chemicals on the land. Restrictions on use of chemicals could slow future increases in yields, and thus require more land for a given level of production.

Most projections of cropland requirements show the United States providing for domestic population increases expected by the year 2000, using less than the total acreage of cropland available for production. The first national assessment (1968) of the Water Resources Council projected a smaller acreage needed for crops to provide for population of 338 million in 2000 than was so used in 1960 for population of 179 million.[4] Projections now being developed by the Economic Research Service for the Water Resources Council do not, on net, present a radically changed picture. Using a lower projected population—308 million in 2000—these calculations show a 13 percent increase in needed acreage of total crops harvested, but a more than adequate supply of cropland available to meet that need.

A recent study, made for the National Water Commission by Earl O. Heady and others at Iowa State University, projected agricultural land and water use under 9 alternative sets of assumptions as to population, water prices, insecticide limitations, and government supply management programs. The general conclusion was that agricultural land would not be a physically or economically scarce resource in the year 2000.[5]

These projections of future agricultural land needs have generally considered only land currently classed as cropland. The country does have substantial additional acreages that could be brought into production. The Conservation Needs Inventory of 1967 inventoried all rural, non-Federal land as to its capability and use for agricultural purposes. In the 48 contiguous States, this totaled 1,438 million acres—about three-quarters of the total land area. This acreage embraced practically all of the land in farms and, except for some federally owned rangeland, accounted for all of our agricultural production excluding forest products. It also includes almost all of the land that has potential but is not now being used for production. The 1967 CNI estimated that 631 million acres are suitable for cultivation (Land Use Capability Classes I–III). Only 365 million acres of this were so used, however. The remainder—266 million acres—is about half in forest and half in grass, and some would require improvement by drainage, irrigation, or conservation works.

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[2] Orville E. Krause. Cropland Trends Since World War II. Econ. Res. Serv. Agr. Econ. Rpt. No. 177. Apr. 1970. p. 2.

[3] Ibid. p. 7.

[4] United States Water Resources Council. The Nation's Water Resources. 1968. p. 3-3-7. A projection was also made to the year 2020, which indicated a population of 468 million people could be supplied using fewer cropland acres than in 1960.

[5] Earl O. Heady, Howard C. Madsen, Kenneth J. Nicol and Stanley H. Hargrove. Agricultural and Water Policies and the Environment. Iowa State University. CARD Rpt. 40 T. p. 232.

As was pointed out above, between 1941 and 1964 about 1.3 million new acres annually were added to the inventory of cropland. A study of land use change in the Southern Mississippi Alluvial Valley during the period 1950–69 shows that, in a 24-million-acre study area, cropland increased by 37 percent at a rate of about 215,000 acres per year.[6]

PASTURE AND RANGE

Some 890 million acres are used for grazing in the United States. This acreage has declined about 13 percent since 1950, but most of the decrease has been in woodland used for grazing, which has a low carrying capacity. Taken as a whole, all pasture and rangeland yields the equivalent of only 4 bushels of corn per acre. Excluding cropland pasture, the yield is half that.[7] However, this land produces the bulk of our feeder cattle. In the Western States, ranges are generally used to capacity and there is some competition with wildlife resources. Demand for beef has been increasing rapidly and is expected to continue to increase. The trend has been to greater use of feed concentrates per pound of meat. However, increased demand for meat has more than offset this effect and has increased total demand for pasture and other types of roughage.

The most serious obstacle to expanding beef output is the production of calves, which requires pasture—or at least forage. There is no basic shortage of land available and adapted to forage production, now or in the near future. However, expansion of calf production appears to be lagging behind increases in demand, and one emerging land use problem is the utilization of more land for cow and calf operations or increasing the productivity of current pasture and rangeland.

URBAN USES

Urban areas contain a clustering of residential, industrial, and commercial uses, as well as the transportation systems and recreational facilities that serve the population. Urban areas, as defined by the U.S. Census, include much undeveloped land on the one hand, but on the other do not include much residential and other urgan types of uses that occur scattered or in small clusters outside the designated urban boundaries.

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[6] Frey and Dill, Op. Cit. p.8.

[7] George C. Allen, Earl F. Hodges, and Margaret Devers. National and State Livestock—Feed Relationships. Econ. Res. Serv. USDA Sup. to Stat. Bul. No. 466. June 19[illegible]. p. 98.

Larger cities have about 30 percent of their surface areas in residential uses, 20 percent in streets and railroads, 15 percent in other public uses, 10 percent in commercial and industrial uses, 20 percent idle, and 5 percent in miscellaneous uses.[8] Smaller cities and towns probably have higher percentages in residential use and idle.

Even though only about one-third of city area is used to house people, intensive urban uses oriented to people are distributed over the country generally in accordance with population distribution (table 1). Thus, while urban uses occupy only about 1.5 percent of the total area of the country and 1.8 percent of the area of the 48 contiguous States, percentages within the 48 States range from a high of 25 percent in New Jersey to a low of .01 percent in Wyoming.

Concentration of population has been increasing. In 1950, the top 5 percent of U.S. counties had 56.8 percent of the population. In 1970, this has risen to 60.8 percent. The Gini ratio, an index of concentration, had increased from .769 to .802 (table 2).

TABLE 1.—DISTRIBUTION OF POPULATION AND URBAN LAND IN THE 48 STATES, 1970

[In percent]

Region	Urban land	Population
Northeast	25	27
Lake	9	8
Corn Belt	17	17
Northern Plains	1	2
Appalachian	7	9
Southeast	9	9
Delta	2	4
Southern Plains	11	7
Mountain	4	4
Pacific	15	13
Total, 48 States	100	100

Source: 1970 Census of Population.

TABLE 2.—MEASURES OF CONCENTRATION OF POPULATION IN THE 48 STATES, 1950–70

[In percent]

Proportion of counties [1]	Proportion of population		
	1950	1960	1970
Top 1 percent	35.6	35.5	34.9
Top 5 percent	56.8	59.1	60.8
Top 10 percent	67.2	70.2	71.8
Top 25 percent	82.8	84.9	86.3
Top 50 percent	95.3	95.8	96.3
Gini ratios [2]	.769	.789	.802
Total (millions) [3]	150.6	178.5	202.1

[1] Including independent cities.

[2] Zero would mean equal distribution, a unity would be maximum concentration or inequality.

[3] 48 contiguous States.

Source: "Rural Development." President's Annual Report to the Congress on Government Services to Rural America. April 1972, p. 9.

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[8] Marion Clawson, Suburban Land Conversion in the United States: An Economic and Governmental Process. Johns Hopkins Press. Baltimore and London. 1971. p. 49. Also, John H. Niedercorn and Edward F. R. Hearle. Recent Land-Use Trends in Forty-Eight Large American Cities. The Rand Corp. Memo RM-3664-1-FF. Sept. 1963. p. 4.

Another indication of increasing concentration can be seen by looking at population increases and decreases from 1960 to 1970 on a county-by-county basis. During that 10-year period, 1,744 counties showed an increase, while 1,372 counties showed a decrease. The population of the 48 contiguous States increased on net by 23.7 million people, but expanding areas, comprising 56 percent of the counties had to accommodate an increase of more than 26 million people.

Intercounty shifts were most pronounced in the Northern Plains Region, where 77 counties increased their population by a total of 347,000; 242 counties lost 236,000 people. Some States had particularly dramatic intercounty shifts. North Dakota as a whole lost 10,000 population between 1960 and 1970. At the same time, 7 of its counties increased by a total 43,000 persons. Mississippi had 33 counties gaining 144,000 population while its other counties lost 105,000—for a net gain of 39,000.

Land in urban areas increased from 27.2 million acres in 1960 to 34.2 million in 1970, an average of about 730,000 acres per year. Probably over half of this acreage was cropland, although this share varies by region of the country. One study by the Economic Research Service indicated that in 48 counties in the West, 76 percent of land urbanized had been cropland.[9] Another study of 96 Northeastern counties showed that 49 percent of urbanized land came from cropland.[10] A study of the Mississippi Alluvial Valley indicated 54 percent of urbanized land came from cropland.[11]

Most of the increase in population between 1960 and 1970 occurred within the Standard Metropolitan Statistical Areas (SMSA's), designated by the Census.[12] In 1970, they contained 70 percent of the population. This proportion varied from a high of nearly 87 percent in the Pacific States to a low of about 35 percent in the Northern Plains, where many trade and residential centers have less than 50,000 population.

The SMSA's had a total land area of about 253 million acres, about 13 percent of the total area of the 48 States. However, only about 10 percent of the SMSA land area was actually within areas considered urban by the Census. This area increased from 18 million acres in 1960 to 25 million in 1970 (considering the same group of counties for both Censuses). Some 0.32 acre was added to the urban area in SMSA's for each person added to the population. Per capita rates ranged from 0.21 acre in the Northeast and Pacific regions to 0.52 acre in the Northern Plains (table 3).

Population density for the 48 contiguous States was 60 persons per square mile in 1960 and 68 in 1970. Density in the 1970 SMSA areas increased from 302 in 1960 to 357 in 1970.[13] Density in the areas outside these SMSA's changed almost imperceptively, from 23 to 24 persons per square mile.

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[9] Henry W. Dill, Jr., and Robert C. Otte. Urbanization of Land in the Western States. ERS-428, USDA 1970. p. 6.

[10] Henry W. Dill, Jr., and Rober C. Otte. Urbanization of Land in the Northeastern United States. USDA. ERS-485. 1971, p. 4

[11] H. Thomas Frey and Henry W. Dill, Jr., Land Use Change in the Southern Mississippi Alluvial Valley 1950-69. USDA. Agr. Econ. Rpt. No. 215. 1971. p. 8.

[12] An SMSA is a group of counties defined as an entire area in or around a city or community of at least 50,000 people in which activities form an integrated economic and social system. In 1970, there were 242 SMSA's in the 48 contiguous States and 1 in Hawaii.

[13] SMSA areas as designated in 1970.

TABLE 3.—INCREASE IN URBAN LAND WITHIN SMSA's, 1960-70

Region	Increases in land (1,000 acres)[1]	Land added per person (acres)
Northeast	1,127	0.21
Lake	571	.36
Corn Belt	1,248	.46
Northern Plains	115	.52
Appalachian	683	.45
Southeast	894	.41
Delta	166	.38
Southern Plains	769	.43
Mountain	430	.33
Pacific	1,092	.21
48 States[2]	7,096	.32

[1] Includes "urbanized areas," plus any additional area in "urban places" of over 2,500 population.
[2] 48 contiguous States.

Source: 1970 Census of Population.

Within the SMSA's, population is concentrated largely in cities and towns, and in unincorporated clusters. These concentrations have much higher average densities of population than do other areas. Urban areas averaged 3,137 persons per square mile for the United States, ranging from 4,101 in the Northeast to 2,024 in the Southern Plains.

Population densities in the urban parts of SMSA's decreased appreciably between 1960 and 1970. This is probably due to the fact that populations of most of the central cities decreased. For example, San Francisco, Washington, Minneapolis, and New Orleans all lost population. Also, the Census may have been slightly more generous in selecting boundaries for urbanized areas and urban places on the fringes, thereby encompassing more rural land. Population densities generally decreased between 1960 and 1970 in the remaining areas of the SMSA's—the "rural" part—lending some credence to this hypothesis.

For the 48 contiguous States, 10 percent of the land area of the SMSA's was classified as urban by the 1970 Census.[14] This varied from almost 20 percent in the Northeast to a little more than 3 percent in the Mountain States.

Average size of SMSA's ranged from 614,000 acres in the Northeast to 2,605,000 acres in the Pacific States, reflecting the average size of counties that comprise them. In general, the average size of counties increases as one moves west.[15]

Gross statistics indicate that large areas of open space—cropland, pasture, woodland, other extensively used land, and idle land—lie within or near the urban centers. Much of this land is beyond any practical access by many urban residents, particularly those who live in the center cities. However, much of the underdeveloped land could be better utilized to provide open space in urbanizing areas.

Land use in the SMSA's varies by region (table 4). In the Appalachian, Southeast, and Delta States, more than half of their nonurban SMSA land is wooded. Both the Lake and Pacific States have over one-third of their area in woodland. The Northeast is the most populous

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[14] "Urbanized areas," plus additional land in "urban places over 2,500 population."
[15] Average size of SMSA's is, to a degree, arbitrary. Some SMSA's abut and could be merged.

TABLE 4.—LAND USE WITHIN ALL SMSA's, BY PERCENT, 1970

Region	Total for SMSA's	Urban part	Rural part				
			Total	Cropland	Pasture range	Forest woodland	Other
Northeast	100	18.9	81.1	21.9	5.7	46.8	6.7
Lake	100	12.4	87.6	43.2	4.0	33.8	6.6
Corn Belt	100	13.6	76.4	50.7	8.1	13.7	13.9
Northern Plains	100	6.6	93.4	62.2	20.6	3.5	7.2
Appalachian	100	12.7	87.3	20.1	9.8	55.4	2.0
Southeast	100	10.7	89.3	14.2	8.6	58.4	8.1
Delta	100	7.3	92.7	20.2	10.8	53.6	8.2
Southern Plains	100	8.8	91.2	26.9	43.7	16.4	4.2
Mountain	100	3.3	96.7	9.1	41.0	14.4	32.2
Pacific	100	6.5	93.5	13.0	18.2	36.1	26.2
48 States	100	10.0	90.0	23.9	18.9	32.2	15.0

Source: 1970 Census of Population and 1967 Conservation Needs Inventory.

area of the country and has over 80 percent of its population in SMSA's. Yet even there, woodland accounts for almost half of the entire SMSA acreage.

SMSA's in the Northern Plains and the Corn Belt had over half of their acres in cropland. In the Lake States, the share was over one-third. Pasture and other open land (including mountains, deserts, and waste lands) occupied over 70 percent of SMSA's in the Mountain States and almost half in the Southern Plains and Pacific States.

Figure 2 shows graphically the distribution of land use within SMSA's. It also shows that in the average SMSA, within a radius of 23 miles of the center, one-third of the area is in woodland, one-quarter in cropland, and one-fifth in pasture and range. Only one-tenth is primarily urban. Density in the non-urban parts averages about 42 persons per square mile, or one person for each 15 acres. As a comparison, the non-SMSA portion of the 48 States averages about 1 person per 27 acres.

TRANSPORT

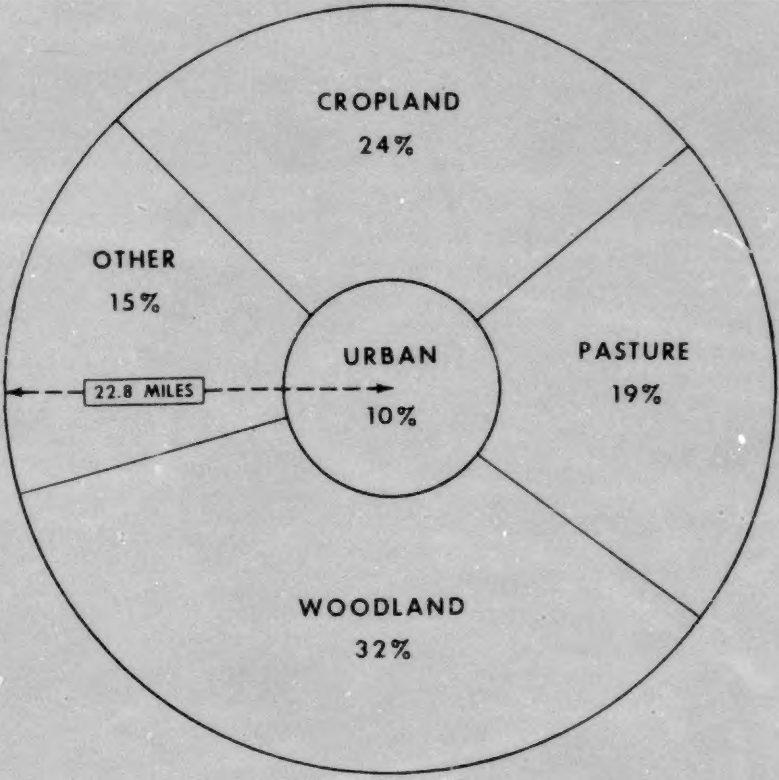
About 21 million acres are devoted to highways and roads outside urban areas. In 1960 the acreage was slightly over 20 million with an annual increase of roughly 100,000 acres per year. The new Interstate Highway system, begun in the late 1950's, now occupies about 1 million acres and has accounted for most of the increase in highway acreage since 1960. Some acreage is being taken as existing roads are widened. However, there is no indication that additional large acreages will be taken for highways in the foreseeable future.

Some 1.8 million acres are estimated to be in rural airports, exclusive of military facilities and private landing strips not open to public use. This acreage has been growing at about 35,000 acres annually. Large airports are usually within urban areas or, if not when first built, rapidly find themselves so. Land used by railroads has been decreasing slightly in recent years.

RECREATION AND WILDLIFE

Over one-half billion acres, about one-fourth of the area of the country, are available for or used for public recreation. However, only

FIGURE 2.—Standard Metropolitan Statistical Area Land Use, Average, 1970
(Percent of Total Area)



PEOPLE PER SQUARE MILE - URBAN AREA 3,137
NONURBAN AREAS 42

SOURCE: U.S. CENSUS OF POPULATION, 1970 AND CONSERVATION NEEDS INVENTORY, 1967.

81 million acres have recreation or wildlife preservation as their major use. Of the half billion acres, 78 percent is owned by the Federal Government and 8 percent by State and local governments. Nine percent is Indian land and 5 percent is privately owned. About one-half million acres are in intensive types of recreational use, about 3 million acres in historic and cultural sites, and 28 million acres in general outdoor recreation use.

Participation in outdoor recreation more than doubled between 1960 and 1970. Most assessments of demand for recreation conclude that recreational activity will increase more rapidly than population. Some types of recreation showing dramatic growth are causing erosion and having other adverse effects in some areas; for example, skiing and off-road vehicles.

About 81 million acres in the United States are in Federal and State parks and related recreational areas and in Federal and State wildlife refuges. These areas increased by about 20 million acres between 1960 and 1970. About half of this increase is accounted for by dedication of public domain lands mostly in Alaska, to preservation of wild ecosystems. Apart from such unusual increases, recreation and wildlife areas increased from 1960 to 1970 at an average annual rate of 1 million acres. Virtually none of this usage competes with agriculture, since the land involved has little potential for agricultural production. Some urban, industrial, and transport uses, however, have been competitive with recreation and particularly with wildlife values.

ENERGY PRODUCTION AND DISTRIBUTION

Many land problems center around energy—its production and consumption. Overall energy consumption has tripled since the mid-1930's and is expected to increase by over 150 percent by the year 2000. Currently, about 20 percent of our energy comes from coal, 75 percent from petroleum and natural gas, and less than 5 percent from hydroelectric power. A fraction of a percent comes from nuclear sources.[16]

Outlook for supplies of the various sources of energy is a complex picture. However, it might be summarized thusly. Natural gas production cannot be expanded greatly. Domestic supplies of oil probably cannot keep pace with domestic consumption. (We have known reserves of from 6 to 10 times current annual production, depending on whether one includes the Alaskan North Slope.) International problems have raised prices of imported oil. Development of nuclear electric-generating plants has been slower than expected because of new concerns about safety and environmental effects.

These situations have increased the demand for coal. The price of coal has increased by over 90 percent since 1967. Increasing costs and difficulties have slowed deep mining, with a resultant increase in surface mining. In 1951, 22 percent of all U.S. coal came from surface mines. This share is now approaching 50 percent. Acreage disturbed for stripping coal is now about 2 million acres and the annual rate is increasing. Between 1965 and 1969 there was a gradual rise. In 1969, the acreage of this strip mining jumped sharply and by 1970 was 100,000 acres annually.[17]

Surface mining has been moving west. The Illinois basin is now the leading area for stripped coal, having passed Appalachia in 1965. Some 77 percent of the country's economically strippable reserves lie in 13 States west of the Mississippi River.[18] Western coal is also lower in sulfur. As utilities switch to low-sulfur coal, surface mining in the West could assume major proportions.

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[16] G. Alex Mills, Harry R. Johnson, and Harry Perry. Fuels Management in an Environmental Age. In Environmental Science and Technology, Vol. 5, No. 1, Jan. 1971. pp. 30–31.

[17] Third Annual Report of the Council on Environmental Quality. 1972. p. 26.

[18] Paul Averitt. Stripping-Coal Resources. USDI. Geo. Surv. Bul. 1322. 1970. p. 23.

Most of the strippable coal is not in areas with extensive acreages of prime agricultural land. Illinois is the main exception. However, stripping often makes impossible any other productive use of the land directly involved, and can have adverse effects on other land in the vicinity.

Another facet of the energy situation is the location of generating facilities away from congested areas to diffuse chemical and thermal pollution of water and air and for safety reasons. The Office of Science and Technology has projected a need for 1,000 sites by 1990, each with a capacity of more than 500 megawatts. The "large majority" of sites will contain powerplants of 1,000 to 4,000 megawatts, with some installations as large as 6,000 megawatts. Half of these sites would be new and half would involve expansion of existing sites.[19] Such facilities could require cooling ponds of one acre or more per megawatt, or would require banks of cooling towers. In any case, they will have major land use impacts wherever they are located.

There are now approximately 300,000 miles of overhead electric transmission lines, with rights-of-way totaling about 4 million acres. Projections call for an additional 200,000 miles of lines and a total of 7 million acres by 1990. These will have relatively minor effects on agricultural use of land, since the only surface preempted is for towers. However, urban and related uses will be generally precluded.[20]

SOLID WASTE DISPOSAL

Per capita generation of residual material has been increasing steadily. People are buying and using more things; and more of these things are of the use-and-discard variety. In 1970 the Council on Environmental Quality estimated that residential, commercial, and institutional wastes amounted to 250 million tons annually, of which 190 million tons were collected. Three-fourths of this waste goes into 14,000 open dumps.[21] Such dumps occupy about 476,000 acres. Environmental impacts, however, are aggravated because the acreage is scattered and affects large acreages of neighboring land. Three-fourths of such dumps can be classed as unsightly. Some 57 percent are in areas of active agriculture.[22] At present rates, about 500 new dumping sites will be needed each year.

LAND AS A CONSUMER GOOD

Ownership of land has always carried a certain mystique, a sense of sovereignty. In recent years, the general affluence of this country has given more people the wherewithal to indulge this fancy and has created a rather broadbased demand for land-as-land. Some of this demand is of course related to camping, hunting, and fishing, and outdoor sports. In any case, substantial acreages are being subdivided and sold. Much of this usage is not competitive with agriculture as rougher, wooded land seems to be preferred. Second homes have probably passed the 2 million mark and it appears that only a fraction of existing parcels have been built on. Problems of water supply, sewage disposal, roads, and provision of other basic services likely lie ahead for many of these areas. Even if the areas are not developed, the fragmented landownership patterns may prevent desirable use of much of the land for years to come.

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[19] Energy Policy Staff, Office of Science and Technology. Electric Power and the Environment. Aug. 1970. p. 26.

[20] Ibid. p. 21.

[21] First Annual Report of the Council on Environmental Quality. 1970. p. 107.

[22] Anton J. Muhlich, Albert V. Klee, and Paul W. Britton. 1968 National Survey of Community Solid Waste Practices. USHEW. Publ. Health Serv. Cincinnati. 1968. p. 337.

SOME GENERALIZATIONS

Even though the assessment of land use presented here is something less than complete or precise, I feel some generalizations are warranted.

The first is the supply of land for food production is probably not the most important problem of land use. In fact, in the aggregate there is probably enough land of appropriate capability for major categories of use projected into the next century.

This does not mean there can't be and aren't now local areas of intense competition and virtual environmental breakdown because of the concentration of humans and human activity within relatively small areas. As was pointed out above, between 1960 and 1970 a little over half of the counties not only had to absorb all of the net population increase of 24 million, but also received a net migration of another 2-plus million from the other counties. Concentration has been increasing, at least since World War II. A number of areas have been especially hard-hit and have acute problems of air pollution, water pollution, accumulation of solid wastes, and sparsity of vegetation and open space.

Within the Standard Metropolitan Statistical Areas there appear to be problems of maldistribution. Even in the more populous regions there are large acreages of forest, cropland, and other extensively used land within SMSA's. Yet this land has little practical value to the millions locked into many of our central cities.

Also, the general concentration of people and human activities is only part of the problem. There are pressures to concentrate some of the activities with greatest environmental impact. Individuals and governmental units play games in which they try to attract and retain desirable activities within their property lines or boundaries, and to keep out or export all the undesirable activities. Cities look for sites for dumps in other jurisdictions. Large electric powerplants, both nuclear and fossil, are being located where smoke and surplus heat are more easily dissipated. While this gets power generation out of congested areas, it usually means construction of one large facility or complex of facilities to serve a region and therefore means a concentration of power generation at that point. More jurisdictions appear to be moving to a closed door policy toward more housing. Many homeseekers then cross city and county borders in their search for land. While this may result in greater dispersion of population, it probably also means more haphazard development in jurisdictions with a minimum of control over building standards, water supply, sewerage, etc.

The final point I would like to make is that we must give continuing thought to the level of government most capable of handling different problems of land use, and to methods of coordinating effort among the various levels. For example, overall distribution of population and human activity is a national, or at least an interstate, problem. The

Federal Government and our large national corporations decide the location of activities that employ large numbers of people. Changes in policy could have important impact on population distribution. Design of interstate power grids and location of the larger electric power plants have distributional effects on population. Our highway system sets the pattern for much of our residential, commercial, and industrial facilities.

Most of the acute problems of land use will have to be tackled, as they always have, at the local level. However, many of these problems do extend over more than one local unit of government, and need either regional or State coordination. The session tomorrow morning on implementation of land use policy and plans will deal with many of these specific problems.

MAJOR USES OF LAND IN THE UNITED STATES

SUMMARY FOR 1969

[By H. Thomas Frey, Geographer, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture]

SUMMARY

The land area of the United States comprises approximately 2,264 million acres. About 57 percent of the area is used to produce crops and livestock and nearly one-fourth is ungrazed forest land. The rest is distributed among urban and transportation uses (less than 3 percent); recreational, wildlife, and other extensive-type special uses (5 percent); and essentially unused areas (13 percent).

One-fifth of the land area is in the crop rotation, but not all of it is used for crops each year. In 1969, cropland used for crops totaled 333 million acres, or 71 percent of the cropland base. The acreage used for crops was 26 million acres less than in 1959 and 54 million acres less than in 1949.

Cropland used for crops decreased sharply during the 1950–62 period primarily in response to Federal programs designed to divert cropland from production. Since 1962, the acreage used for crops has fluctuated by several million acres annually, more or less in balance with demand for crop production.

Pasture and range acreages totaled about 890 million acres in 1969, or 39 percent of the land area. This total includes grassland used primarily for grazing (604 million acres), cropland used alternately for pasture (88 million acres), and forest land used secondarily for grazing (198 million acres).

The total acreage of land used for pasture and range declined 54 million acres, or 6 percent, in the last decade. However, most of the net decrease is attributable to the removal or reclassification of low-forage-yielding areas, principally woodland, from grazing use. The remaining acreage was significantly upgraded by gradual substitution of inherently better land, brush clearing, fertilization, and other means.

Special nonagricultural uses of land occupied 169 million acres in 1969, and continue to increase in importance as the Nation's population increases. One-third of this total is in urban and transportation uses. Each year, about 1.2 million additional acres of all types of land are occupied by urban areas, rural highways and roads, airports, and reservoirs. Urban growth alone accounts for three-fourths million acres; reservoirs take much of the remainder of the land in special uses.

Extensive-type special uses increased 20 million acres during the 1960's. Virtually all of the increase occurred in park and wildlife areas; more than half of the increase was reserved from public domain

p. 130 blank

wildlands in Alaska for wildlife purposes. Other acreages in extensive special uses changed little, as small gains in Federal industrial and State institutional areas were offset by attrition in national defense areas. Apart from the unusually large increase in the acreage in Alaskan wildlife refuges, gains in extensive special use areas averaged about 1 million acres annually.

One-third of the area of the United States is forested. The total acreage of forest land has not changed greatly in several decades, but important changes in the relative proportions of forest land and other major uses have occurred at regional and local levels. Since 1950, substantial acreages of open land have reverted to forest, particularly in regions east and south of the Corn Belt. Those gains have been largely but not completely offset by land clearing for urban and other uses in these and other regions. In the last decade, several million acres of forested wetlands in the Delta Region were cleared for crop use.

Three-fifths of the land area of the United States is in private ownership and two-fifths is owned by Federal, State, and local governments. Nearly 99 percent of the cropland, 61 percent of the grassland, and 56 percent of the forest land are in private ownership exclusive of Indian tribal and trust lands. Large acreages of grassland, forest land, and wasteland, plus much of the special-use acreage, are publicly owned.

THE COUNTRY AS A WHOLE

The publication summarizes the findings of an inventory of major land uses in the United States as of 1969. By comparison with similar studies for earlier years, significant changes and trends in land use also are identified. The findings are presented briefly at the national level of aggregation and then treated in more detail at the regional level. State-by-state acreages for individual major uses of land are shown in the appendix tables.

Present land use

The land area of the United States totals approximately 2,264 million acres.[1] This vast, physically diverse area can be grouped in five broad use categories as follows: cropland, including cropland used only for pasture, 472 million acres; grassland pasture and range, 604 million acres; forest land exclusive of reserved areas in parks and other special uses, 723 million acres; urban, transportation, recreation, and other service-type uses, 178 million acres; and miscellaneous other land, 287 million acres (table 1, fig. 1).

Because of multiple and alternate uses of land, additional breakdown of the five primary use categories is needed to fully distinguish between agricultural and nonagricultural uses (table 2). Overall, agricultural uses occur on 1,283 million acres, or 57 percent of the land area. This total includes land in the crop rotation, all types of pasture and range, and a small acreage in closely related uses. If forest land not grazed is included, agricultural uses account for 80 percent of the land area.

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[1] As reported by the U.S. Bureau of the Census (*6*). The land area includes all dry land; land temporarily or partly covered by water, such as marshland, swamps, and flood plains; linear water areas less than one-eighth mile wide; and other water bodies with less than 40 acres of surface area. (Italicized numbers in parentheses refer to items of literature cited.)

TABLE 1.—MAJOR USES OF LAND, UNITED STATES, 1969

Major land use	Acreage (million acres)	Percentage of total (percent)
Cropland [1]	472	20.9
Grassland pasture and range [2]	604	26.7
Forest land [3]	723	31.9
Special uses [4]	178	7.9
Miscellaneous other land [5]	287	12.6
Total land area [6]	2,264	100.0

[1] All land in the crop rotation. This total is higher than the 438 million acres reported by the Soil Conservation Service for 1967 (11), due primarily to the inclusion of larger acreages classified as cropland used only for pasture.

[2] Permanent grassland and other nonforested pasture and range.

[3] Excludes 31,000,000 acres of reserved and other areas duplicated in special-purpose uses. Total forest land is shown in appendix table 9.

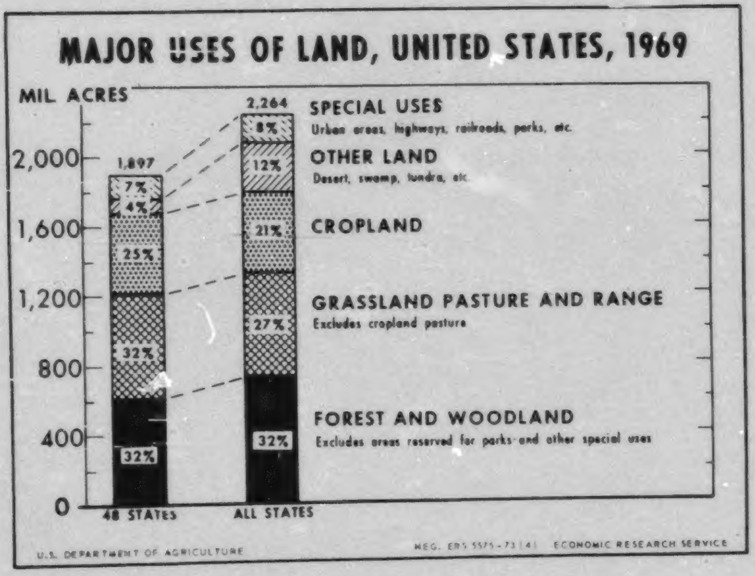
[4] Urban and transportation areas, areas used for recreation and wildlife purposes, various public installations and facilities, farmsteads, and farm roads.

[5] Marshes, open swamps, bare rock areas, desert, tundra, and other land generally having low value for agricultural purposes.

[6] Includes streams and canals less than ⅛-mile wide; and ponds, lakes, and reservoirs covering less than 40 acres.

Note: Estimates are based primarily on reports and records of the Bureau of the Census and Federal and State land management and conservation agencies.

FIGURE 1



The 472 million acres classified as cropland represent the acreage available for crops or used alternately for crops and pasture, rather than the acreage annually used for crop production. In 1969, the land used for crop production (cropland harvested, crop failure, and cultivated summer fallow) totaled 333 million acres, or 71 percent of the available cropland. The rest was temporarily idle (51 million acres) or was used only for pasture (88 million acres). The idle component includes much of the acreage diverted under the various production adjustment programs administered by USDA.

TABLE 2.—AGRICULTURAL AND NONAGRICULTURAL USES OF LAND, UNITED STATES, 1969

Major land use	Acreage (million acres)	Percentage of total (percent)
Agricultural:		
Cropland	472	20.9
Cropland used for crops [1]	(333)	(14.7)
Soil improvement crops and idle cropland	(51)	(2.3)
Cropland pasture	(88)	(3.9)
Grassland pasture and range [2]	604	26.7
Forest land grazed	198	8.7
Farmsteads, farm roads	9	.4
Total agricultural land	1,283	56.7
Nonagricultural:		
Forest land not grazed [3]	525	23.2
Special uses	169	7.5
Urban and other built-up areas [4]	(61)	(2.7)
Primarily for recreation and wildlife [5]	(81)	(3.6)
Public installations and facilities [6]	(27)	(1.2)
Miscellaneous	287	12.6
Total nonagricultural land	981	43.3
Total land area	2,264	100.0

[1] Cropland harvested, crop failure, and cultivated summer fallow.

[2] Excludes cropland used only for pasture.

[3] Excludes reserved and other forest land duplicated in parks and other special use areas. It was not feasible to eliminate all overlap that exists because of multiple use.

[4] Urban areas; highway, road, and railroad rights-of-way; and airports.

[5] National and State parks and related recreational areas, national and State wildlife refuges, and national forest wilderness and primitive areas.

[6] Federal land administered by the Department of Defense and the Atomic Energy Commission, and State land in institutional and miscellaneous special uses.

[7] Includes miscellaneous uses not inventoried, and areas of little use such as marshes, open swamps, bare rock areas, desert, and tundra.

Note: Estimates are based primarily on reports and records of the Bureau of the Census and Federal and State land management and conservation agencies.

Grassland and other nonforested areas used primarily for livestock grazing total 604 million acres, or 27 percent of the Nation's land area. In addition, grazing occurs as a secondary use on 198 million acres of forest land and, as noted above, is an alternate use on 88 million acres of cropland. Collectively, the three major types of pasture and range total 890 million acres, or 39 percent of the total land area.

Although 57 percent of the total land area is used for agricultural purposes, only 47 percent, including some land not classified here as agricultural, is in farms (table 3). Agricultural land not in farms totals 288 million acres and consists of open and forested grazing land. Part of the grazing acreage not in farms represents normal underenumeration but most of it is definitionally excluded in the Census of Agriculture. The major portion of this land is federally owned, and is mainly in grazing districts and national forest system range allotments.

Forest land not grazed, which totals 525 million acres, is the dominant nonagricultural use of land. However, 754 million acres—one third of the total land area of the United States—is forested. Two-thirds of this larger acreage is classified as commercial by the U.S. Forest Service. The rest is classified as noncommercial because of low timber productive capacity or, as in the case of some public lands, because of legal reservation for recreational and other nontimber uses.

Nonagricultural special-use areas for which estimates were made occupy 169 million acres. One-third of the special use acreage is in

TABLE 3.—MAJOR USES OF LAND IN FARMS AND NOT IN FARMS, UNITED STATES, 1969

Major land use	Land in farms		Land not in farms		Total acreage (millions)
	Acreage (millions)	Percentage of total	Acreage (millions)	Percentage of total	
Agricultural uses of land:					
Cropland [1]	472	100			472
Grassland pasture and range [2]	452	75	152	25	604
Woodland grazed	62	31	136	69	198
Farmsteads, farm roads	9	100			9
Total, agricultural land	995	78	288	22	1,283
Nonagricultural land:					
Forest land not grazed [3]	50	10	475	90	525
Special uses [4]			169	100	169
Other land [5]	19	7	268	93	287
Total nonagricultural land	69	7	912	93	981
Total land area	1,064	47	1,200	53	2,264

[1] All land in the crop rotation.
[2] Excludes cropland used only for pasture.
[3] Excludes reserved areas in parks and other special-use areas.
[4] Urban and transportation areas, recreational and wildlife areas, and various public installations and facilities.
[5] Miscellaneous uses not inventoried and marshes, open swamp, desert, tundra, etc.

Note: Estimates are based primarily on reports and records of the Bureau of the Census and Federal and State land management and conservation agencies.

urban and transportation uses; one-half comprises areas administered by Federal and State agencies, primarily for recreation and wildlife purposes; and one-sixth is used for various public installations and facilities.

Except for minor uses not inventoried, the remaining 13 percent of the land area consists of marshes, swamps, bare rock areas, desert, tundra, and similar areas characterized by little economic surface use. More than two-thirds of the land in this category is tundra and other unused areas in Alaska.

The proportion of land in various major uses is different for the 48 contiguous States than for the entire United States (fig. 1). For the 48 States, 57 percent of the total land area is cropland and grassland pasture and range, compared with 48 percent for the 50 States. Alaska and Hawaii add less than one-half million acres of cropland and about 3 million acres of grasslane pasture. Alaska, however, adds more than 100 million acres of forest land and more than 200 million acres of tundra and miscellaneous other land.

Trends in major land uses

Periodic changes in major uses of land since 1900 are shown in table 4 and fig. 2. Cropland, exclusive of cropland pasture, increased more than 80 million acres from 1900 to 1920, fluctuated near and above the 400 million level until 1950, decreased 17 million acres or 4 percent during the 1950's and declined slightly thereafter. The net decrease since 1950 represents a sharp decrease in cropland actually used for crops, and a partially offsetting increase in idle cropland.

Grassland pasture and range, including cropland used only for pasture, decreased 100 million acres from 1900 to 1920 and decreased an additional 30 million acres by 1950.[2] Grassland pasture acreage has

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[2] Cropland used only for pasture and permanent grassland pasture are combined in this comparison because the two types have not always been successfully differentiated in the Census of Agriculture and in other surveys of agricultural land use. For most purposes, however, cropland used only for pasture is considered an integral part of the total cropland base.

TABLE 4.—TRENDS IN MAJOR USES OF LAND, UNITED STATES, SELECTED YEARS

[In million acres]

Major land use	1900	1920	1940	1950	1959	1969
Cropland [1]	319	402	400	409	392	384
Available grassland pasture and range [2]	832	731	719	701	699	692
Forest and woodland [3]	719	721	727	721	728	723
Other land [4]	400	416	426	442	451	462
Special-use areas				(138)	(151)	(178)
Unclassified areas				(304)	(301)	(287)
Total [5]	2, 270	2, 270	2, 272	2, 273	2, 271	2, 264

[1] Exclude cropland used only for pasture.

[2] Grassland pasture and other nonforested grazing land plus cropland used only for pasture. Includes some idle grassland, particularly before 1920.

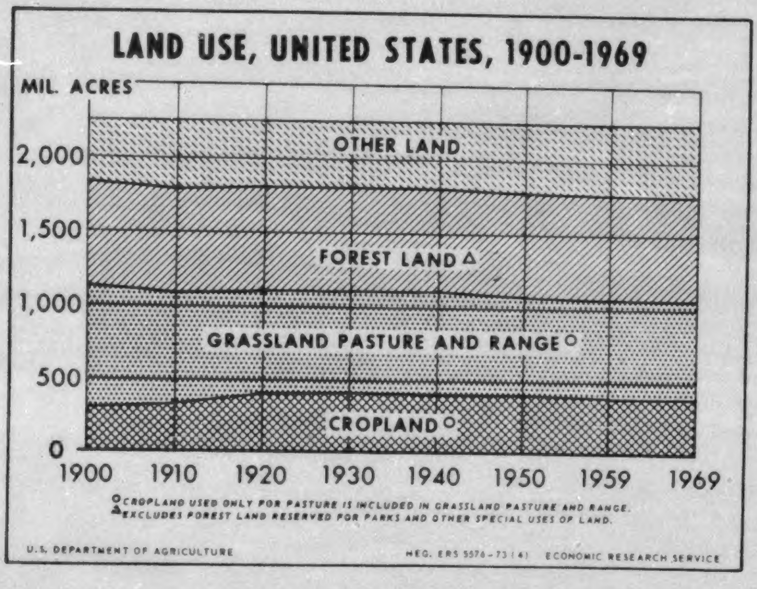
[3] Exclusive of reserved forest land in parks, wildlife refuges, and other special-use areas.

[4] Includes special land uses, such as urban areas, highways and roads, farmsteads, parks, and military reservations, and also land having slight surface-use value (desert, rock, marshes, tundra, etc.).

[5] Changes in total land area are attributable to changes in methods and materials used in occasional remeasurements, and to increases in the area of artificial reservoirs.

Note: Estimates for 1900-1959 are based primarily on Wooten et al., and assume essentially no change in Alaska and Hawaii prior to 1950. The estimates are only approximately comparable.

FIGURE 2



declined about 1 percent since 1950. Changes prior to 1950 were largely attributable to expansion and maintenance of the cropland base. The small net decrease since 1950 primarily reflects the growth of urban and other special uses of land and the re-evaluation of the suitability of some areas for grazing.

The total acreage of forest and woodland has been characterized by relative stability since 1900, although the relationships in table 4 would be somewhat different if reserved forest land was included. Substantial acreages of forest land have been cleared since 1900 for crops, pasture, and urban, transportation, and other uses but these have been counterbalanced by natural reversion and, sometimes, replanting of open land to trees. In recent years, reversion tendencies have been strong in the Eastern United States; however, widespread urbanization and localized clearing for crops and pasture have effectively offset reforestation in the East as a whole.

Periodic measurements of land in special-purpose uses are not available for all of this century. Since 1950, however, the special uses specified in table 4 have absorbed an estimated 40 million acres, or about 2 million acres annually. Areal expansion in this category has involved all types of land, including wasteland. Nearly half of the total acreage shifted to intensive or largely non-reversible uses such as urban and transportation areas and artificial reservoirs. Most of the remainder shifted to parks, wildlife refuges, and similar uses involving little change in vegetative cover or actual use. In general, the increase in special-purpose uses is associated with increases in the size and affluence of the population.

BASIC LAND USE PATTERNS

Land used primarily for agricultural production (cropland and nonforested grazing land) accounts for nearly half of the nation's land area. Forest land accounts for about one-third and other land for one-fifth, but the proportions vary greatly across the country. Within the distributional patterns of these broad groups, variable proportions of cropland are planted, harvested, grazed, and idle. Other land uses are dual or multiple, as when forest land is used simultaneously for timber production and other purposes such as grazing, recreation, or a source of water. Sometimes, only one use is feasible, as in arid or semiarid areas where field crops and forest are climatically precluded but where land is usable for grazing during some part of the year. As a framework for considering the variable characteristics and distribution of important land use components in subsequent sections, aggregate regional acreages of cropland, permanent grassland pasture, forest land, and other land are shown in table 5 and fig. 3.

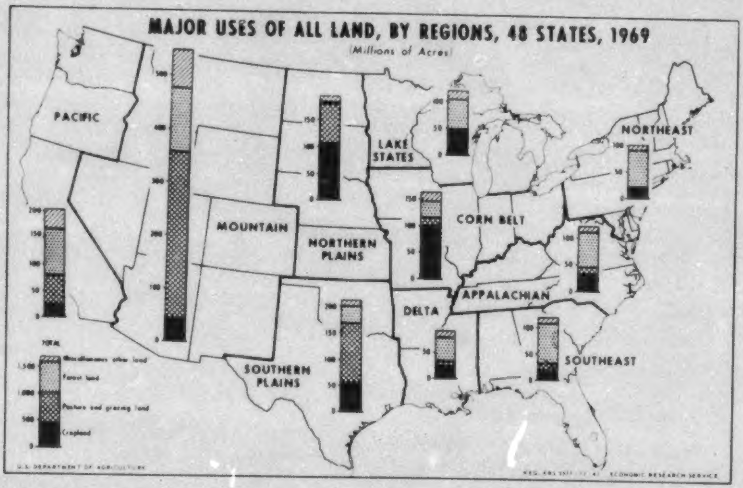
CROPLAND

Major uses of cropland

The nation's cropland resources total 472 million acres, or 21 percent of the land area. This total represents neither the acreage actually used in crop production each year nor the acreage that could be used for crops. Rather, it represents the acreage presently in the crop rotation. In any given year, part of the available cropland is used for crops, part is used only for pasture, and the rest is idle. Component acreage of the total cropland base in 1959 were as follows:

	Million acres	Percent
Cropland harvested	286	61
Crop failure	6	1
Cultivated summer fallow	41	9
Total used for crops	333	71
Soil improvement and idle cropland	51	11
Cropland used for pasture	88	18
Total cropland	472	100

FIGURE 3



MAJOR USES OF ALL LAND, BY REGIONS, 48 STATES, 1969
(Millions of Acres)

TABLE 5.—MAJOR USES OF LAND, BY REGIONS, UNITED STATES, 1969

Region[1]	Cropland[2]		Pasture and range[3]		Forest land[4]		Other land		Approximate land area	
	Million acres	Percent	Million acres	Percent	Million acres	Percent	Million acres	Percent	Million acres	Percent
Northeast	17.9	16	3.2	3	71.2	63	19.8	18	112.1	100
Lake States	44.3	36	6.2	5	52.5	43	19.0	16	122.0	100
Corn Belt	120.0	62	14.0	8	31.1	19	17.9	11	165.0	100
Northern Plains	107.2	55	72.9	38	4.5	2	9.6	5	194.2	100
Applachian	31.6	25	8.4	7	73.1	59	10.8	9	123.9	100
Southeast	20.4	17	10.5	8	77.1	62	15.6	13	123.6	100
Delta States	24.6	27	8.4	9	50.5	55	8.8	9	92.3	100
Southern Plains	56.0	26	111.3	53	33.0	16	11.5	5	211.8	100
Mountain	43.4	8	313.5	57	119.9	22	71.1	13	547.9	100
Pacific	24.3	12	52.6	26	89.9	44	37.4	18	204.2	100
48 States	471.7	25	601.0	32	602.8	32	221.5	12	1,897.0	100
Alaska	(5)	(5)	1.6	(5)	118.3	33	242.6	67	362.5	100
Hawaii	.4	9	1.0	24	1.6	42	1.1	25	4.1	100
U.S. total	472.1	21	603.6	27	722.7	32	465.2	20	2,263.6	100

[1] States comprising the respective regions are shown in appendix table 1.
[2] All land in the crop rotation.
[3] Includes open permanent pasture both in farms and not in farms.
[4] Total forest land area as reported by the U.S. Forest Service, excluding reserved woodland and forest areas in National and State parks and other special use areas. It was not feasible to eliminate all duplication existing because of multiple use.
[5] Less than 100,000 acres or 0.5 percent.

Because of crop failure and land preparation requirements, the acreage harvested does not fully identify the total acreage required in crop production. Cropland used for crops or the land input to crop production is more adequately measured by aggregating three component acreages—cropland harvested (286 million), crop failure (6 million), and cultivated summer fallow (41 million). Thus, the acreage required for crop production in 1969 totaled 333 million acres or 71 percent of the available cropland.

The harvested acreage includes all intertilled and close-sown crops: tree fruits, small fruits, and planted tree nuts including some nonbearing acreages; and wild hay. A small part of the harvested acreage yields more than one crop per year.

Crop failure mainly involves the acreage on which crops failed because of weather, insects, and diseases but this component includes some cropland not harvested because of lack of labor, low market prices, and other factors. Generally, crop failure is only 2 or 3 percent of the harvested acreage but the proportion varies regionally and annually.

Cultivated summer fallow refers to cropland in subhumid regions of the West that is fallowed for a season or more before small grains are planted. The fallowed land is cultivated to control weeds and to conserve or accumulate sufficient moisture to produce a crop. Acreages of cultivated summer fallow vary from year to year by several million acres, depending largely on the planting intentions of farmers. Other types of fallow—such as cropland planted to soil improvement crops but not harvested, and cropland left idle all year—are not included in cultivated summer fallow.

The rest of the cropland acreage was either used for pasture (88 million acres) or was idle (51 million acres) in 1969. Part of the 51 million acres in idle status was seeded to soil improvement crops but was not harvested or pastured. This practice improves productivity of the land in subsequent years by controlling weeds and increasing organic matter in the soils. Some cropland is idle each year for various physical and economic reasons. Other idle acreages are on the verge of abandonment for crop use.

Although the acreage in idle status is in general agreement with the acreage diverted from production under Federal farm programs in 1969 (58 million acres), the two are only roughly identical in composition. In addition to differences suggested above, part of the diverted acreage is in the cultivated summer fallow component.

Much of the 88 million acres of cropland used only for pasture is routinely rotated between crop and pasture use, although the rotation period varies. However, a substantial amount has essentially the same characteristics as permanent grassland pasture in farms and may remain in pasture indefinitely.

Cropland uses, by regions

In 1969, seven-tenths of the nation's 472-million-acre cropland base was used for crops, two-tenths was used for pasture, and about a tenth was idle (table 6). In absolute terms, acreages of cropland used for crops are particularly large in the Corn Belt and Northern Plains and are relatively large in the Lake States, Southern Plains, and Mountain Regions. As a proportion of total cropland, cropland used for crops is above the national average of 71 percent in the Northern Plains, Mountain, and Pacific Regions; about average in the Lake States and Corn Belt; and below the average in the Northeast and Southern United States. The proportion of total cropland actually used for crops ranges from 47 percent in the Appalachian Region to 82 percent in the Northern Plains.

TABLE 6.—CROPLAND USES, BY REGION, UNITED STATES, 1969

[In thousands of acres]

Region [1]	Cropland			
	Used for crops [2]	In soil improvement crops or idle	Used for pasture	Total
Northeast	12,204	1,980	3,669	17,853
Lake States	31,507	7,532	5,293	44,332
Corn Belt	70,718	14,365	16,886	101,969
Northern Plains	88,313	7,651	11,273	107,237
Appalachian	14,758	4,444	12,428	31,630
Southeast	11,539	3,251	5,634	20,424
Delta States	15,933	1,941	6,684	24,558
Southern Plains	33,907	5,303	16,833	56,043
Mountain	34,850	2,783	5,726	43,359
Pacific	19,049	1,498	3,755	24,302
48 States	332,778	50,748	88,181	471,707
Alaska	14	1	3	18
Hawaii	176	160	36	372
U.S. total	332,968	50,909	88,220	472,097

[1] See app. table 4 for data by States.

[2] Includes cultivated summer fallow.

Idle cropland, including cropland in soil improvement crops, comprises about 11 percent of cropland nationally but ranges from about 5 or 6 percent in Alaska and the Pacific Region to 17 percent in the Lake States. In general, the proportion of idle cropland is higher than the national average in the eastern half of the country and lower in the western half. The largest absolute regional acreage, 14 million acres, or 28 percent of the total, is in the Corn Belt. As classified here, a high proportion of the cropland in Hawaii is idle but much of the acreage is in crops for harvest in a later year.

Cropland used only for pasture accounted for 19 percent of all cropland in 1969, but was double this rate in the Appalachian Region and was relatively high throughout the Southeast, South, and Southwest, where it appears in association with substantial cropland abandonment. At the other extreme, only 10 percent of the cropland in the Northern Plains was pastured. However, cropland pasture acreages in both the Northern Plains and the Corn Belt were relatively large due to the large acreages of total cropland in these regions.

Trends in major uses of cropland

Although the total acreage classified as cropland has not changed greatly in the past two decades, important changes have occurred in individual use components (table 7 and fig. 4). Of particular interest, cropland used for crops decreased from 387 million acres, the record high, in 1949 to 333 million in 1969. Much of the decrease in acreage used for crops occurred in three brief periods, 1950, 1956–57, and 1961–62, as a result of major Federal programs designed to shift cropland from production to soil conserving uses. Since 1962 the acreage used for crops has fluctuated by several million acres, more or less in balance with demand for crop production.

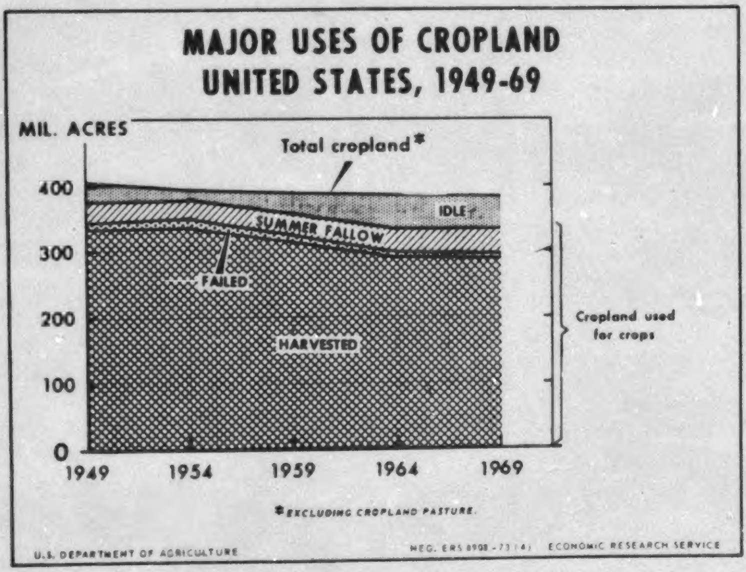
Cropland harvested, the basic component of the acreage used for crops, decreased from 352 to 286 million acres from 1949 to 1969, or more sharply than the total acreage used for crops. The effect of this

TABLE 7.--MAJOR USES OF CROPLAND, UNITED STATES, CENSUS YEARS, 1949-69

[In millions of acres]

Use of cropland	1949	1954	1959	1964	1969
Cropland harvested	352	339	318	292	286
Crop failure	9	13	10	6	6
Cultivated summer fallow	26	28	31	37	41
Total used for crops	387	380	359	335	333
Soil improvement and idle	22	19	33	52	51
Cropland used for pasture	69	66	66	57	88
Total cropland	478	465	458	444	472

FIGURE 4



decrease was partly offset by a general upward trend in cultivated summer fallow. Acreages of crop failure, the smallest and least controllable component, ranged between 2 and 4 percent of the harvested acreage during the comparison period.

Cropland in soil improvement crops and other idle cropland trended upward as the acreage used for crops decreased. The overall or net increase in idle land from 1949 to 1969 was 29 million acres, or from 22 to 51 million acres. This increase was closely associated with land diverted from crop production under Federal programs, although additional cropland was diverted to cultivated summer fallow and to various noncropland uses. Idle cropland, particularly that diverted from production to soil-conserving crops, represents a source of cropland as needed. Hence, the acreage tends to vary inversely with annual changes in the acreage of cropland used for crops.

Cropland used only for pasture has not been enumerated consistently in the Censuses of Agriculture because responding farm operators did not interpret the definition of this category uniformly from area to area and from year to year. For example, cropland used only for pasture, as enumerated in the 1964 and 1969 Censuses, increased from 57 to 88 million acres. The sharp increase in 1969 probably is attributable to inadvertent enumeration of permanent grassland pasture in farms, which decreased correspondingly. Thus, although available statistics indicate a stable trend followed by a recent increase, it is more likely that cropland pasture acreages were fairly stable throughout the comparison period. However, some cropland established to conserving uses suitable for pasture under the soil bank program has now returned to cropland pasture use.

Because of inconsistencies in cropland pasture acreages, trends in total cropland are more apparent when cropland pasture is excluded from comparison totals. By this measure, cropland (the combined acreages of cropland used for crops and idle cropland) totaled 409 million acres in 1949; 399 million in 1954; 392 million in 1959; 387 million in 1964; and 384 million in 1969. Overall cropland exclusive of cropland pasture trended downward by 25 million acres, with most of the net change (17 million) occurring in the 1950's. In contrast, when inconsistent estimates of cropland pasture are included, total cropland trended downward by 34 million acres between 1949 and 1964 and then virtually regained these losses by 1969.

Trends in cropland used for crops, by regions

Regional acreages of cropland used for crops followed the national trend (48 States) during 1949–62, and tended to diverge during 1962–69 (table 8 and fig. 5). During the former period, all regions experienced some decrease in cropland used for crops, ranging from 1 million acres in the Mountain Region to 10 million acres in the Southern Plains.

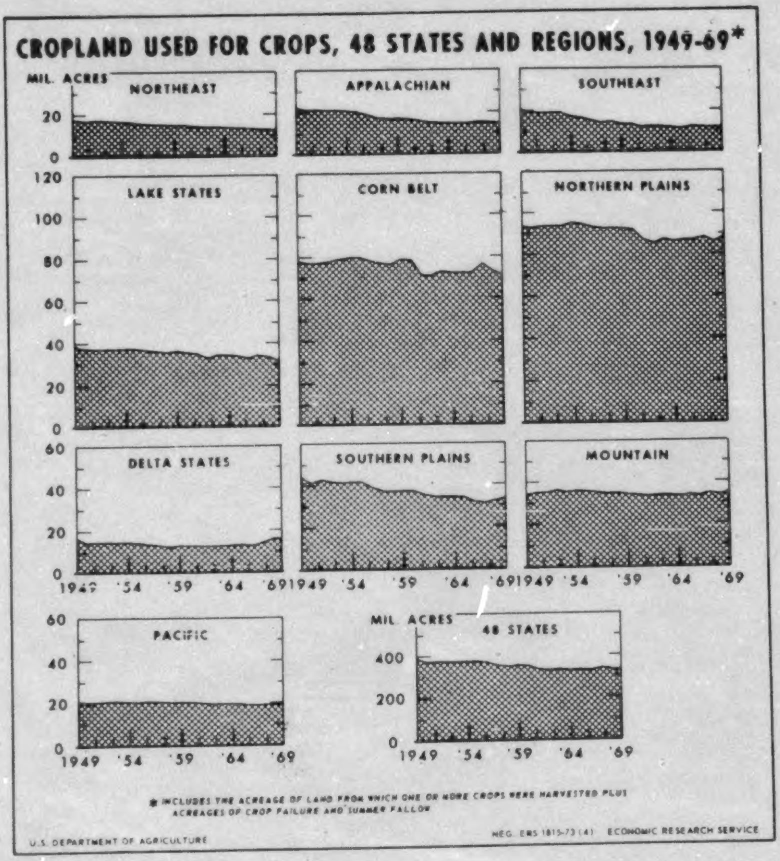
TABLE 8.—CROPLAND USED FOR CROPS, BY REGION, 48 STATES, 1949–69 [1]

[In millions of acres]

Year	Northeast	Lake States	Corn Belt	Northern Plains	Appalachian	Southeast	Delta States	Southern Plains	Mountain	Pacific	48 States
1949	17.2	38.2	78.0	93.9	22.3	20.2	16.6	44.7	34.7	20.8	386.6
1950	17.1	37.5	77.2	93.3	21.1	18.7	15.3	41.7	35.2	20.2	377.3
1951	17.0	37.7	77.4	93.8	21.2	18.7	15.4	43.4	35.9	20.6	381.1
1952	16.9	37.4	77.8	93.8	20.8	19.0	15.1	41.8	36.6	20.8	380.0
1953	16.8	37.6	78.8	94.0	20.6	18.9	14.9	41.3	35.8	20.8	379.5
1954	16.6	37.6	79.4	95.5	20.0	17.6	14.8	41.5	36.2	20.7	379.9
1955	16.4	37.6	79.5	94.6	19.9	17.3	14.3	41.4	36.2	20.5	377.7
1956	15.9	37.4	78.5	92.8	18.9	16.1	13.7	38.9	35.7	20.8	368.7
1957	15.7	36.4	77.2	90.1	17.5	15.1	13.2	37.3	35.2	20.5	358.2
1958	15.5	36.0	76.9	90.4	17.2	13.7	12.5	36.8	35.3	20.5	354.8
1959	15.2	36.7	78.8	90.2	17.4	14.6	13.1	37.6	34.4	20.5	358.5
1960	14.9	35.8	78.4	91.5	17.1	13.3	12.8	37.2	34.1	20.2	355.3
1961	14.5	35.3	71.6	86.9	16.1	12.7	12.8	35.8	33.8	20.1	339.6
1962	14.2	33.3	70.7	85.3	15.4	11.9	12.7	34.4	33.9	19.4	331.2
1963	14.2	34.5	72.5	87.1	15.2	12.1	13.1	34.8	34.0	19.8	337.3
1964	14.0	34.3	72.0	86.2	15.0	11.9	13.5	34.1	33.9	19.9	334.8
1965	13.7	34.1	72.4	87.2	15.1	11.5	13.7	34.0	34.5	19.7	335.9
1966	13.7	33.3	72.7	87.5	15.0	11.0	13.6	32.0	33.8	19.4	332.0
1967	13.4	34.4	76.2	88.2	15.7	12.1	14.9	31.6	34.1	19.7	340.3
1968	12.7	33.7	72.6	86.2	15.5	11.8	16.1	32.5	34.1	19.7	334.9
1969	12.2	31.[illegible]	70.7	88.3	14.8	11.5	15.9	33.9	34.9	19.1	332.8
1970	12.6	32.[illegible]	71.6	87.1	15.0	11.8	16.3	30.9	34.9	19.4	331.6
1971	12.7	34.4	75.3	88.5	16.4	12.8	16.3	30.4	34.3	19.4	340.5
1972 [2]	12.5	34.1	71.3	87.4	16.0	12.4	16.3	29.7	34.9	19.6	334.2

[1] Cropland used for crops is the sum of the acreage from which one or more crops were harvested plus acreage of crop failure and cultivated summer fallow.
[2] Preliminary.

FIGURE 5



CROPLAND USED FOR CROPS, 48 STATES AND REGIONS, 1949-69*

* INCLUDES THE ACREAGE OF LAND FROM WHICH ONE OR MORE CROPS WERE HARVESTED PLUS ACREAGES OF CROP FAILURE AND SUMMER FALLOW

U.S. DEPARTMENT OF AGRICULTURE — NEG. ERS 1815-73 (4) ECONOMIC RESEARCH SERVICE

Compared with the national decline of 15 percent during 1949–62, the acreage used for crops decreased 13 percent in the Lake States; about 10 percent in the Corn Belt, Northern Plains, and Pacific Regions; and less than 5 percent in the Mountain Region. In all other farm production regions, decreases in cropland used for crops were greater than the national rate. Regional decreases in the South and Southwest ranged from 24 percent in the Delta States and Southern Plains to 30 percent in the Appalachian Region and 40 percent in the Southeast Region. Although the decline in the Northeast was relatively moderate, it represented 18 percent of the regional acreage used for crops in 1949. The general decline in acreage used for crops was mainly attributable to Federal acreage diversion programs.

Comparison of regional acreages of cropland used for crops in 1962 and 1969 reveals little change in six farm production regions and a divergent pattern in others. Decreases of about 2 million acres each in the Northeast and Lake States continued the historical downward trends in those regions. Acreages changed little in such diverse regions as the Corn Belt, Appalachian, Southeast, Southern Plains, and Pacific Regions, but increased 1 to 3 million in the Northern Plains, Delta States, and Mountain Regions. The increase in the Northern Plains generally represents normal annual variations in the acreage used for crops. However, the increase in Delta States represents a definite upward trend. In recent years, substantial acreages of alluvial soils in the lower Mississippi Valley have been cleared and drained for crops, more than offsetting cropland abandonment elsewhere in the region. Similarly, the gradual expansion of irrigation (app. table 13) has helped to maintain or increase cropland acreage in the Mountain Region.

The general but unequal declines in regional acreage since World War II have increasingly concentrated the cropland used for crops in relatively favored regions. From 1949 to 1962, the Lake States, Corn Belt, Northern Plains, Mountain, and Pacific Regions collectively increased their proportional share of the national acreage from 69 to 73 percent. In these five regions, cropland used for crops decreased at less than the national rate. After 1962, this trend was modified somewhat, as perceptible proportional increases in cropland used for crops were limited to the Northern Plains, Mountain Region, and Delta States.

Although obscured by net regional decreases since 1949, the acreage used for crops has increased in numerous areas and localities. A recent study of the 1944–64 period found that acreages used for crops plus idle cropland increased in 868 counties (28 percent) and decreased in the remaining counties. The total increase in increasing counties was 26.7 million acres or 1.3 million per year, as opposed to the total decrease in decreasing counties of 53.5 million acres or 2.6 million per year. Acreages of new cropland were concentrated heavily in the lower Mississippi Valley, Central and Southern High Plains, Central California, and Northern Montana. New cropland acreages were less concentrated but still large in the Corn Belt, the Dakotas, Florida, and several areas of the West. In general, cropland development in the East is associated with wetland drainage and in the West with the expansion of irrigation. Improved dryland farming techniques also have contributed to cropland increases, especially in Montana.

The outstanding recent instance of cropland development is the alluvial plain of the Mississippi River, particularly that portion in in Arkansas, Louisiana, and Mississippi. From 1950 to 1969, cropland in the alluvial areas of these States increased 3.3 million acres, or 40 percent, as the result of intensive clearing and drainage of forested wetlands. The effects of reclamation became especially evident after 1962, when new cropland development in the alluvial plain accelerated and acreages used for crops elsewhere in the Delta Region tended to stabilize. The overall acreage used for crops in the Delta Region has trended steadily upward since 1962.

Several factors have combined to greatly increase productivity per acre of cropland used for crops since 1949. In general, adjustments in the acreage used for crops have resulted in increasingly concentrated cropping of the most productive land, both on individual farms and by areas and regions. The substitution of new cropland and improvement of existing cropland by such means as land forming, drainage, and irrigation have also upgraded the acreage used for crops. To these improvements in basic land capability have been added larger inputs of fertilizer, pesticides, and herbicides; use of improved plant varieties, machinery, and equipment; and more efficient farm organization. Further increases in productivity are attributable to changes in the proportions of intensive and extensive crops produced. From 1949 to 1969, output per crop acre increased more than 50 percent and total crop production increased more than 40 percent. In comparison, the nation's population increased 34 percent from 1950 to 1970.

Changes in composition of crops harvested

Crops harvested, including several million acres harvested in succession from the same land, totaled 291 million acres in 1969 or 56 million less than in 1954. This substantial reduction in acreage of crops harvested was accompanied by significant changes in the acreage of several crops and crop types (table 9 and app. table 12). Broadly grouped, feed crops decreased from 224 to 168 million acres because of major reductions in the acreage of corn and oats and substantial reductions in barley and hay acreage. In contrast, food crops gained 15 million acres or 16 percent during this period (1954–69). The increase in food crops was attributable to soybean acreage, which more than doubled—from 17 to 41 million acres. Wheat, the dominant food crop in terms of acreage, decreased 7 million acres or 13 percent. Other food crops showed only small, offsetting changes. Crops other than feed and food crops decreased 13 million acres, mainly reflecting large reductions in cotton and flaxseed acreages. As a result of these shifts, feed crops now account for only 58 percent of the acreage of crops harvested, as opposed to 65 percent in 1954; food crops gained proportionally—from 26 to 36 percent; and other crops lost proportionally—from 9 to 6 percent.

PASTURE AND RANGE RESOURCES

Livestock grazing occurs on about 890 million acres or 39 percent of the land area (table 10). The total includes acreages in three major types—cropland used alternately for pasture (88 million), grassland and other nonforested land used more or less exclusively for grazing (604 million), and forest land on which grazing occurs as a secondary or additional use (198 million). This distribution is approximate, as

TABLE 9.—CROPS HARVESTED, BY TYPE, 48 STATES, CENSUS YEARS, 1954–69[1]

[In millions of acres]

Crop	1954	1959	1964	1969
Food grains	59	55	53	51
Other food crops	32	37	46	55
Total food crops	91	92	99	106
Feed grains	152	143	111	108
Hay	72	66	67	60
Total feed crops	224	209	178	168
Other crops	32	23	21	17
Total crops harvested	347	324	298	291

[1] See appendix table 12 for individual crop acreage and sources of data.

interfaces between major types of pasture and range are not always precise either in nature or in available statistics. Cropland pasture and permanent grassland pasture are difficult to differentiate in some cases. Similarly, grassland pasture and range includes some brushland or wooded areas, and forested grazing land includes many areas of open forage.

Of the total pasture and range, 602 million acres were enumerated as land in farms. Pasture and range in farms includes all of the cropland pasture (88 million acres), 75 percent of the permanent grassland pasture, (452 million acres), and 31 percent of the forest land grazed (62 million acres). Most grazing land in farms is in private, State, and Indian ownership. Less than 10 percent of the Federal range, consisting mainly of scattered areas grazed under lease, is enumerated as land in farms.

The 288 million acres of grazing land not in farms consists of 152 million acres of grassland and other non-forested areas, and 136 million acres of forest land. More than 200 million acres of the grazing land not in farms is federally owned, mainly in Federal grazing districts and national forest system range allotments. These areas are grazed under a permit rather than lease arrangement and, as such, are not enumerated as land in farms. Much of the non-Federal grazing land not in farms consists of large forest tracts in the South.

In relative terms, forage yields are high on cropland pasture, moderate on grassland pasture in farms, and low on both open and forested grazing land not in farms. However, all pasture and range types generally represent extensive uses of land. Thus although grazing occurred on triple the acreage of harvested cropland, only about one-third of all livestock feed was obtained from this source.

Livestock grazing is much more important in the agricultural economies of sparsely populated areas of the West than nationally. The Mountain Region alone has 398 million acres of pasture and range (table 10). This total represents 45 percent of the Nation's pasture and range, 73 percent of the region's land area, and nearly 10 times the region's cropland (exclusive of cropland pasture). As a proportion of land areas, total pasture and range acreages are equally high in the Southern Plains and are above the national average in the Northern Plains, Delta States, and Pacific Regions.

Grazing is relatively unimportant in some regional agricultural economies but is important in absolute terms. An example is the Corn Belt, where 17 million acres of cropland pasture are distributed in proportion to a much larger total cropland acreage. Forage from this acreage, plus smaller acreages of permanent grassland and woodland pasture, is equivalent to several times this acreage of semiarid Western range. Yet its value is overshadowed by much larger returns from cultivated cropland in the region.

Regional distribution, by major pasture type

The proportion of total pasture and range in individual pasture types differs significantly among the farm productions regions (table 10). Grassland pasture accounts for 60–85 percent of total pasture and range acreage in regions comprising the 17 Western States; exceeds other types in the Lake States, Alaska, and Hawaii; and is important in all regions. The total acreage in the 17 Western States is 550 million

TABLE 10.—PASTURE AND RANGE, BY TYPE AND REGION, UNITED STATES, 1969

[In thousands of acres]

Region	Cropland pasture [1]	Grassland pasture and range [2]	Forest land pasture and range [3]	Total pasture and range [4]	
				Acreage	Percentage of land area
Northeast	3, 669	3, 162	2, 238	9, 069	8
Lake States	5, 293	6, 175	4, 735	16, 203	13
Corn Belt	16, 886	13, 948	11, 975	42, 809	26
Northern Plains	11, 273	72, 940	2, 358	86, 571	46
Appalachian	12, 428	8, 427	6, 669	27, 524	22
Southeast	5, 634	10, 498	13, 619	29, 751	24
Delta States	6, 684	8, 433	21, 391	36, 508	40
Southern Plains	16, 833	111, 349	26, 341	154, 523	73
Mountain	5, 726	313, 478	79, 071	398, 275	73
Pacific	3, 755	52, 594	29, 084	85, 433	42
48 States	88, 181	601, 004	197, 481	886, 666	47
Alaska	3	1, 624	111	1, 738	(5)
Hawaii	36	987	451	1, 474	36
U.S. total	88, 220	603, 615	198, 043	889, 878	39

[1] Mainly cropland in rotation, used some years for cultivated crops and other years for pasture.

[2] Excludes cropland used for pasture.

[3] An approximation of the acreage grazed to some extent during the year.

[4] Excludes 57,000,000 acres in Federal grazing districts and national forest system range allotments, characterized by little value for grazing.

[5] Less than 0.5 percent.

acres, or 90 percent of all permanent grassland. The concentration of permanent nonforested grazing land in the Western United States is attributable to natural conditions that limit alternative land uses.

Cropland pasture acreages are distributed roughly in proportion to total cropland but comprise a higher proportion of cropland in regions undergoing significant cropland abandonment. Hence, acreages are relatively large in the Corn Belt, Northern Plains, Southern Plains, and Appalachian Regions. Among these regions, however, cropland pasture is the dominant type in only the Corn Belt and the Appalachian Region. Among other regions, it is the dominant type only in the Northeast, a region where the total pasture and range acreage is relatively small.

Acreages of woodland grazing land range from about 2 million acres in the Northeast and Northern Plains to 79 million acres in the Mountain Region. Aggregate acreages are relatively large throughout the West, Southwest, and South but represent the dominant pasture type in only two regions—the Southeast and Delta States. In other regions, acreages of forest land grazed are smaller than grassland pasture acreages and are often smaller than cropland pasture acreages.

The regional variation in forest land grazed reflects both the amount of forest land and such factors as forest species composition and stand density.

Changes in pasture and range acreages

Changes in cropland pasture and grassland pasture are difficult to measure, as they have been inconsistently interchanged in agricultural surveys. When both types are combined, however, total grassland pasture has been almost stable since 1950, decreasing only slightly—from 701 to 692 million acres in 1969 (table 11). In comparison, the forested component of the grazing acreage decreased from 319 to 198 million acres. The major decrease in woodland grazed, plus the small

TABLE 11.—TOTAL PASTURE AND RANGE, BY TYPE, UNITED STATES, CENSUS YEARS, 1950-69

[In millions of acres]

Type	1950	1954	1959	1964	1969
Grassland pasture and range	701	700	699	697	692
Cropland pasture	(69)	(66)	(66)	(57)	(88)
Open permanent pasture	(632)	(634)	(633)	(640)	(604)
Woodland grazed	319	301	245	225	198
Total pasture and range	1,020	1,001	944	922	890

decrease in grassland pasture, reduced the total acreage grazed by 130 million acres, or 13 percent, from 1950 to 1969.

Most of the small net decrease in the combined acreage of temporary and permanent grassland pasture occurred after 1959, when losses slightly exceeded gains in a majority of regions. This trend is associated with a decelerated rate of cropland abandonment, the tendency of open land to reforest, and the expansion of urban and other special uses of land. Prior to 1959, the combined grassland pasture acreage decreased substantially in the Mountain and Pacific Regions, primarily because of a reduction of acreage classified as suitable for grazing. These losses were essentially offset by a relatively large increase in grassland pasture in the Southern Plains, and small regional increases elsewhere that occurred in association with the general decline in acreage used for crops.

Forest land grazed has declined in all regions since 1950. Rough approximations of the acreage in this type indicate a national decline of about 40 percent and regional declines equaling or exceeding the national rate except in the Mountain Region and, possibly, the Corn Belt and Northern Plains. Among the factors associated with the major downtrend in forested grazing land are (1) improved livestock feeding and forest management practices, (2) changes in forest species and stand density, (3) clearing and reclassification of woody vegetation to grassland, (4) closing of low-capacity and other areas to grazing, and (5) the general dedline in the acreage of land in farms.

The net decreases in both grassland and forest land grazed generally represent the removal of areas of low productivity from the grazing acreage. At the same time, grassland pasture has been gradually improved by brush clearing, reseeding, fertilization, and shifts of cropland to pasture. Thus, although the total acreage grazed has declined since 1950, the average quality of the remaining pasture and range acreage has been significantly upgraded. Available data indicate that total pasture production has increased about 10 percent since 1960.

FOREST LAND

The total area in the United States classified as forest land is 754 million acres. Of this total, 500 million acres, or two-thirds, is commercial forest, i.e., suitable and available for growing continual crops of industrial timber products. The remaining third is classified as noncommercial because of inherent low timber-producing capacity or, in the case of some public lands, legal reservation for recreation and other nontimber uses. The noncommercial acreage includes some areas in the Alaskan interior that will probably be classified commercial when a detailed survey is completed.

The total forest land acreage is about equally divided between the 31 Eastern States and the 17 Western States plus Alaska and Hawaii. In contrast, the proportions classified as commercial and noncommercial in the two regional groupings are strikingly dissimilar. In the 31 Eastern States, 94 percent of the forest land is classified as commercial; in the remaining 19 States, only 36 percent is of commercial quality. Exclusive of Alaska, however, the average for the Western States is 51 percent. Individual Eastern regions not only have disproportionately large shares of the commercial forest land, but also have the highest proportions of their total land area classed as forest (table 5).

Although substantial acreages of open land have reverted to forest since 1950, these gains have been largely offset by new land clearing for crops, pasture, urban, and other uses. During the 1950's, forest land expanded measurably in a broad region extending from the Northeast to the Delta States but these increases were partly offset by decreases in other regions, particularly the Southern Plains. Since 1960, forest land has increased, at least slowly, in a majority of the States east and south of the Corn Belt; these gains were more than offset by sharp decreases in a few States, most notably those comprising the Delta Region. As a result of these opposing changes, total forest land is now less than 1 percent above the 1950 acreage (table 4).

Most of the forest area is considered to be primarily used for forestry but it typically serves multiple purposes. For example, about one-fourth of the acreage is grazed by livestock and large acreages are available for some degree of recreational use. In addition, forest land universally provides watershed protection and wildlife habitat. Forest land exclusive of the area grazed and the areas used primarily for other purposes totals approximately 525 million acres.

SPECIAL AND MISCELLANEOUS USES

Special use areas

Special uses of land, including urban and transportation areas, recreational and wildlife areas, and other uses occupied 178 million acres in 1969, or 8 percent of the land area of the country (table 12). Urban and transportation areas accounted for 61 million acres or one-third of the total. National and State parks and related recreational areas occupy 49 million acres. An additional 32 million acres are reserved for wildlife protection and propagation. About 28 million acres have been set aside for defense and atomic energy purposes, and 8 million acres are occupied by farmsteads, farm roads, and farm lanes. This grouping of special-purpose uses includes the most, and some of the least, intensively used land in the country. Except for land used for farmsteads, farm roads, and farm lanes, these uses are nonagricultural.

Special uses of land traditionally have been assesed in terms of their their effect on agricultural land supplies. From this standpoint, urban areas and, to a lesser extent, transportation uses are of particular interest. As urban and transportation areas expand in rural areas, they may progressively occupy or isolate land in other uses in existing proportions: but when a choice is possible, a disproportionate share of level, well-drained land is normally taken.

TABLE 12.—SPECIAL USE AREAS, UNITED STATES, ESTIMATES FOR 1969

Special use area[1]	Area (1,000 acres)	Share of total (percent)
Nonagricultural:		
Intensive uses:		
Urban areas	34,590	19.5
Highways and roads	20,977	11.8
Railroads	3,221	1.8
Airports	1,755	1.0
Total	60,543	34.1
Extensive uses:		
National Parks	28,281	15.9
State parks	6,710	3.8
Wilderness and primative areas	14,290	8.0
Federal wildlife refuges	25,442	14.3
State wildlife refuges	6,634	3.7
National defense areas	23,441	13.2
Federal industrial lands	2,146	1.2
State institutional and other uses	1,918	1.1
Total	108,842	61.2
Total nonagricultural lands	169,385	95.3
Agricultural:		
Farmsteads	6,564	3.7
Farm roads and lanes	1,856	1.0
Total agricultural special use lands	8,420	4.7
Total special use areas	177,805	100.0

[1] Definitions and procedures are given in footnotes to table 10, showing special use areas by States.

At the other extreme, parks, wildlife areas, wilderness and primitive areas, monuments, memorials, and related uses usually conflict only slightly with agricultural use of land. Although relatively large acreages are involved, a high proportion of the extensive special use acreage is located in portions of the 11 Western States and Alaska, where physical conditions limit or preclude agricultural activities. Even in the better agricultural regions of the East, much of the recreational and wildlife acreage is unsuitable for agricultural purposes.

In times of expansion, national defense areas and other public installations and facilities represent the middle ground between urban-transportation and recreation-wildlife uses as competitors with agriculture for space. The present distribution pattern indicates that not more than one-fourth of the acreage for these facilities (7 million acres) is located in viable agricultural areas. The acreage of former cropland used intensively for these purposes or irreversibly lost to agriculture is considerably smaller.

Although farmsteads, farm roads, and farm lanes generally complement rather than compete with agricultural uses, they occupy a substantial area of land. The acreage in individual farms devoted to these uses varies by size of farm, type of farming activity, and other factors. Much of the acreage involves land originally suitable for crops and pasture.

Rate of growth of special use areas

Available estimates, although not precise or completely consistent over time, indicate that the special use areas grouped in table 13 increased 27 million acres, or an average of 2.7 million acres annually, during 1959–69 (table 13). Most of the individual uses specified also

TABLE 13—SPECIAL USE AREAS, UNITED STATES, 1959 AND 1969

[In millions of acres]

Special use area [1]	[2] 1959	1969	Change
Urban areas	27.2	34.6	+7.4
Transportation areas	24.7	26.0	+1.3
Recreation and wildlife areas	61.5	81.4	+19.9
Public installations and facilities	27.5	27.4	−.1
Farmsteads and farm roads	10.1	8.4	−1.7
Total	151.0	177.8	+26.8

[1] Individual uses are specified in table 12.

[2] From Wooten, et al.

increased. Among intensive uses, the area in urban places increased from 27.2 to 34.6 million acres, an average of three-fourth million acres annually. Comparison of population and area data for 1960 and 1970 indicates that urban areal growth exceeded urban population growth in recent years. When aggregated by components, average densities decreased in the central cities of urbanized areas and in smaller places outside the urbanized areas. In contrast, density in the suburban fringe, where 69 percent of urban population increase occurred, was virtually unchanged. The emerging pattern suggests some abandonment of older areas for improved living space elsewhere, rather than an effective gain in per capita living space.

Rural transportation areas increased from 24.7 to 26.0 million acres, or 130,000 acres annually during the 1960's. Construction of new highways, particularly the Interstate system, averaged about 100,000 acres and new airports averaged 37,000 acres yearly. These gains were slightly offset by a small decrease in the acreage of railroad rights-of-way. The overall increase in rural transportation areas was also minimized by incremental reclassification of both highway and airport areas to urban areas, which continually expand into rural areas.

Areas of artificial reservoirs have been deducted from total land area as used herein. However, substantial acreages of land are converted to reservoirs each year. The total fluctuates, but land taken by reservoirs of 5,000 acre-feet or more has averaged approximately 300,000 acres in recent years. By combining this total with some 870,000 acres taken by urban and transportation uses, it is estimated that about 1.2 million acres of all types of land shift to the specified intensive special uses each year. This rate is above the rate of 1.0 million estimated for the 1950–60 decade, mainly because of accelerated urban growth.

Extensive-type nonagricultural uses of land increased 20 million acres from 1959 to 1969. Virtually all of the increase is attributable to recreational and wildlife uses, which expanded by 5 and 15 million acres respectively. Much of the added wildlife acreage comprised public domain wildlands in Alaska that were reserved in extraordinarily large blocks. Apart from such unusual increases, recreation and wildlife areas increased by roughly 1 million acres annually.

Public installations and facilities changed little in the last decade, as small increases in the acreage of State-administered institutional areas were offset by attrition in national defense lands. Much of the acreage held for defense purposes was assembled during the World War II period, and currently may not be fully utilized.

The estimated acreage in farmsteads, farm roads, and farm lanes—relatively intensive uses and the only special uses classified as agricultural—decreased correspondingly with decreases in the number of farms and land in farms.

Miscellaneous other land

Except for minor acreages in special uses that were not inventoried, the remaining 287 million acres of the Nation's land resources consist largely of swamps, marshes, bare rock areas, desert, tundra, and similar areas. Acreages of miscellaneous land are relatively large in arid portions of the West and several Atlantic and Gulf Coastal areas but particularly large in Alaska, which has 212 million acres or nearly three-fourths of the total. Although characterized by little or no economic surface use, these areas generally have utility for wildlife purposes and some have value for minerals. From the standpoint of potential use, inroads will continue to be made for special purposes, while limited areas will be irrigated or otherwise reclaimed for agriculture.

MAJOR USES OF LAND, BY CLASS OF OWNERSHIP

The land resources of the United States are classified by major ownership and use classes in table 14. About three-fifths of the land area is privately owned and two-fifths is publicly owned.

Federal land, totaling 763 million acres, mainly comprises the residual of the original public domain but also includes 55 million acres acquired by purchase and other means. Almost half (47 percent) of the Federal land is distributed in the 11 Western States and an equal amount is located in Alaska. Grazing is the primary use of 165 million acres of grassland and is a secondary use on 60 million acres of forest land. Livestock have access to an additional 57 million acres, mainly forest types, that have low productivity and grazing utility but are intermingled and managed with better quality Federal rangeland. Other major uses of Federal land are forest land (including forest land grazed), 37 percent; special uses, 12 percent; and miscellaneous land including desert, tundra, etc., 30 percent. Most of the area in extensive special uses also is federally owned.

TABLE 14.—MAJOR CLASSES OF LAND, BY USE AND OWNERSHIP, UNITED STATES, 1969

[In millions of acres]

Ownership [1]	Cropland	Grassland pasture and range	Forest land [2]	Special use and other land	Total land area
Federal	1	165	278	319	763
State and other public [3]	2	41	38	53	134
Indian [4]	2	32	13	3	50
Private	467	366	425	59	1,317
Total	472	604	754	434	2,264

[1] Federal, State, local government, and Indian land acreages are approximations based on public records and reports. Private land is the rest of the land area in each major use.

[2] Includes reserved forest land in parks and other special uses.

[3] Does not fully reflect recent land grants from the public domain to the State of Alaska.

[4] Trust land held by tribes and individual Indians. About 4,900,000 acres of federally owned land, located mainly in Alaska, are also used by Indians.

State and local governments have accumulated landholdings of varying size through such means as grants of land from the Federal Government, tax reversion, purchase, gift, and escheat. These publicly administered areas are distributed somewhat more evenly than Federal land, but are still characterized by a high degree of concentration. The larger acreages are located mainly, but not exclusively, in the Western States. State and local governments hold land for forests, parks, wildlife areas, watershed protection, highway and road rights-of-way, institutional uses, and other specific purposes. Most Western States also own relatively large acreages without specific use designations. About 43 million acres in the category, including 41 million acres of grassland, are used for grazing.

Nearly 35 million acres of Indian land (68 percent of this category) are used by Indian farmers and livestock operators for farming and grassland pasture and range. In addition, about 13 million acres of Indian forest land are used for grazing. Indian land, like Federal and State land, is concentrated in the Western States.

Private land, exclusive of that in Indian ownership, totals 1,317 million acres, or 58 percent of the land area of the United States. Included in the privately owned total are 99 percent of the Nation's cropland, 61 percent of the grassland pasture, 56 percent of the forest land, and 13 percent of the miscellaneous land. As these percentages indicate, a large proportion of the land with relatively favorable attributes is in private ownership.

Excluding cropland used for pasture, private and other non-Federal grassland and pasture and range total about 439 million acres in the 50 States. An additional 138 million acres of private and other non-Federal woodland and forest are used for grazing. Federal range classified as usable or suitable for grazing totals 225 million acres; nearly three-fourths of this area is grassland and the rest is forest and woodland. Thus, 802 million acres, including both private and public land but excluding cropland pasture, are classed as pasture and range. Of the total acreage, 604 million acres are grassland or nonforest, and 198 million acres are woodland and forest.

DEFINITIONS AND EXPLANATIONS OF LAND USE CLASSES

Cropland—Total cropland includes six components—cropland harvested, crop failure, cultivated summer fallow, soil-improvement crops not harvested or pastured, and cropland used only for pasture. Cropland used only for pasture may also be combined with other pasture and grazing categories if the total pasture and range acreage is desired.

The six cropland components often are grouped more broadly as (1) cropland used for crops, (2) cropland used only for pasture, and (3) idle cropland. Cropland used for crops comprises the acreages of cropland harvested, crop failure, and cultivated summer fallow. This category is intended to measure the actual land input to crop production.

Idle cropland includes the combined acreages of soil-improvement crops not harvested or pastured, and land completely idle for a variety of physical and economic reasons. Much of the land diverted from crop production by Federal farm programs is in this category.

Cropland used only for pasture represents that part of the total cropland base that is used alternately for pasture each year. Most cropland pasture eventually rotates back to crop use and is replaced, more or less, by land rotating from other cropland components. However, part of the acreage may remain in pasture indefinitely or may shift to other uses.

Pasture and range—Estimates of the acreage of pasture and range include open permanent pasture in farms, cropland used only for pasture, farm woodland pastured, and grazing land not in farms. Grazing land not in farms is part grassland, part shrubs and other nonforest growth, and part forest land.

Total pasture and range (890 million acres) represents the land that contributes to livestock forage production. Thus, where available data permitted, areas characterized by little forage productivity but intermingled and managed with productive grazing land were omitted in this study. Estimates for many individuals States exclude some areas grazed sporadically. Much of the omitted acreage is in the forest land component.

Total pasture and range, including areas casually affected by grazing, is indicated in a recent Forest Service report on the forest-range environment of the 48 contiguous States. That study reports that 835 million acres, or seven-tenths of the forest-range environment, are grazed to some extent. By combining this acreage with cropland pasture, improved grassland pasture, and small acreages of pasture and range in Alaska and Hawaii, the Nation's pasture and range resources total about 1 billion acres.

In the study reported here, pasture and range is classified in two different ways. One breakdown includes grassland pasture and grazing land, and forest pastured or grazed. The second breakdown separates pasture in farms from grazing land not in farms.

Grassland pasture and range—Grassland pasture and grazing land includes all land used primarily for pasture and grazing, exclusive of the forest land pastured or grazed. It includes the shrub and brushland types of pasture and grazing land such as sagebrush, scattered mesquite, and some other shrub types in the West; some scattered brushland pasture in the East; and all tame and native grasses and legumes and other forage used for pasture or grazing.

Because of differences in vegetative composition and use characteristics, grassland pasture and range is not always clearly distinguishable from other types of pasture and range. At one extreme, permanent grassland may merge with cropland pasture at the other, grassland often intermingles or forms transitional areas with forest grazing land.

Forest pasture and range—Forest pasture and range consists mainly of open forest, cutover areas, brushgrown pasture, arid woodlands, and other land within forested areas that has grass or other forage growth. The total acreage of forested grazing land includes woodland pasture in farms plus rough approximations of forested grazing land in farms. For many States, the approximations include significant areas grazed only lightly or to scattered extent.

Forest land—Forest land as defined by the U.S. Forest Service includes land at least 10-percent stocked by trees of any size, or formerly having had such tree cover and not currently developed for nonforest use. The total includes chaparral areas in the West, as well as afforested areas.

Most of the forest land in the East, North, and South is classified as commercial, whereas about half of the forest land in the West and Southwest is classified as noncommercial. Noncommercial forest includes inaccessible alpine ranges, chaparral, mesquite, pinion-juniper, and semiarid shrub and brush growth.

Special-use areas—The special uses in this report include areas for highway, road, and railroad rights-of-way; airports; farmsteads, farm roads and lanes; urban and town areas; parks, wilderness, and primitive areas; wildlife refuges; national defense areas; and State-owned land held for institutional sites and miscellaneous other uses, such as National Guard camps and rifle ranges, fairgrounds, airports, radio stations, flood-control areas, and watershed-protection areas.

Among special uses of rural land for which estimates are not available are those for industrial and commercial sites in rural areas, powerline rights-of-way, cemeteries, golf courses, mining areas, and clay, sand, and stone quarry sites. Areas in rural villages and small towns with populations of 100 to 1,000 are not included in urban and town areas. Acreages in these villages and towns are included in other major uses of land such as forest, grazing, and other land.

Water area in large reservoirs is not included among the special uses of land; the figure for the approximate land area of the United States excludes all natural or artificial water bodies of 40 acres or more.

Miscellaneous other areas—Miscellaneous land includes marshes, sand dunes, bare rock areas, deserts and tundra.

Appendix Tables

TABLE 1.—MAJOR USES OF LAND, BY STATE AND REGION, UNITED STATES, 1969

[In thousands of acres]

State and region	Cropland [1]	Grassland pasture and range [2]	Forest land [3]	Special uses [4]	Other land [5]	Approximate land area [6]
Maine	735	174	17,605	807	468	19,789
New Hampshire	198	57	5,046	294	182	5,777
Vermont	867	290	4,384	250	140	5,931
Massachusetts	288	49	3,412	1,219	14	5,009
Rhode Island	32	5	429	201	4	671
Connecticut	252	54	2,119	654	33	3,112
New York	6,276	1,295	14,897	5,796	2,348	30,612
New Jersey	713	61	2,396	1,573	70	4,813
Pennsylvania	6,065	849	17,638	3,810	416	28,778
Delaware	533	34	390	183	128	1,268
Maryland	1,894	294	2,925	981	236	6,330
District of Columbia				39		39
Northeast	17,853	3,162	71,241	15,807	4,066	112,129
Michigan	8,682	1,338	19,100	3,879	3,364	36,363
Wisconsin	12,270	2,526	14,892	2,830	2,339	34,857
Minnesota	23,380	2,311	18,466	3,952	2,636	50,745
Lakes States	44,332	6,175	52,458	10,661	8,339	121,965
Ohio	12,584	2,374	6,422	3,038	1,806	26,224
Indiana	14,071	2,038	3,870	2,007	1,116	23,102
Illinois	25,466	2,614	3,745	3,289	565	35,679
Iowa	28,398	2,089	2,250	2,104	961	35,802
Missouri	21,450	4,833	14,828	2,378	688	44,157
Corn Belt	101,969	13,948	31,115	12,816	5,116	164,964
North Dakota	30,187	11,278	422	1,469	983	44,339
South Dakota	20,844	24,030	1,699	1,821	217	48,611
Nebraska	23,379	22,179	1,031	1,719	641	48,949
Kansas	32,817	15,453	1,344	2,234	486	52,344
Northern Plains	107,237	72,940	4,496	7,243	2,327	194,243
Virginia	4,925	2,282	16,075	1,961	216	25,459
West Virginia	1,763	863	12,126	597	56	15,405
North Carolina	6,480	1,216	20,224	2,693	618	31,231
Kentucky	9,810	1,871	11,887	1,524	284	25,376
Tennessee	8,652	2,195	12,820	2,236	547	26,450
Appalachian	31,630	8,427	73,132	9,011	1,721	123,921
South Carolina	3,663	979	12,403	1,614	685	19,344
Georgia	7,103	1,275	25,157	2,747	885	37,167
Florida	3,773	5,834	17,753	4,794	2,464	34,618
Alabama	5,885	2,410	21,748	1,909	500	32,452
Southeast	20,424	10,498	77,061	11,064	4,534	123,851
Mississippi	8,394	2,864	16,892	1,290	829	30,269
Arkansas	10,202	2,895	18,237	1,501	410	33,245
Louisiana	5,962	2,674	15,342	1,803	2,974	28,755
Delta States	24,558	8,433	50,471	4,594	4,213	92,269
Oklahoma	16,036	16,599	8,926	2,142	317	44,020
Texas	40,007	94,750	24,064	7,026	1,919	167,766
Southern Plains	56,043	111,349	32,990	9,168	2,236	211,786
Montana	16,493	49,873	19,899	4,405	2,506	93,176
Idaho	6,166	22,073	18,030	4,051	2,593	52,913
Wyoming	2,813	45,911	5,885	5,282	2,319	62,210
Colorado	11,105	29,711	19,387	3,121	3,086	66,410
New Mexico	2,351	51,025	17,256	5,189	1,882	77,703
Arizona	1,665	41,354	17,420	8,102	4,046	72,587
Utah	1,983	24,893	14,720	5,050	5,895	52,541
Nevada	783	48,638	7,255	7,243	6,409	70,328
Mountain	43,359	313,478	119,852	42,443	28,736	547,868

See footnote at end of table.

TABLE 1.—MAJOR USES OF LAND, BY STATE AND REGION, UNITED STATES, 1969—Continued

[In thousands of acres]

State and region	Cropland [1]	Grassland pasture and range [2]	Forest land [3]	Special uses [4]	Other land [5]	Approximate land area [6]
Washington	8, 278	6, 982	20, 739	5, 498	1, 108	42, 605
Oregon	5, 145	22, 756	29, 387	2, 520	1, 749	61, 557
California	10, 879	22, 856	39, 826	15, 834	10, 676	100, 071
Pacific	24, 302	52, 594	89, 952	23, 852	13, 533	204, 233
48 States	471, 707	601, 004	602, 768	146, 659	74, 821	1, 896, 959
Alaska	18	1, 624	118, 276	30, 529	212, 069	362, 516
Hawaii	372	987	1, [illegible]	617	510	4, 112
U.S. total	472, 097	603, 615	722, 670	177, 805	287, 400	2, 263, 587

[1] Total acreage in the crop rotation.

[2] Grasslands and other nonforested pasture in farms excluding cropland used only for pasture, plus estimates of open or nonforested grazing land not in farms.

[3] Forest land, excluding reserved forest land and some unreserved areas duplicated in parks and other special uses of land. Total forest land is shown in appendix table 9.

[4] Urban, transportation, recreational, and other special uses of land specified in appendix table 10.

[5] Miscellaneous areas with low agricultural use value, such as marshes, open swamps, bare rock areas, deserts, and tundra.

[6] Approximate land area as developed by the Bureau of the Census in conjunction with the 1970 Census of Population (June 1972). Includes all dryland and land termporarily or partially covered with water, such as marshland, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than ⅛ mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

TABLE 2.—MAJOR USES OF LAND IN FARMS, BY STATE AND REGION, UNITED STATES, 1969

[Thousands of acres; excepting percentages]

State and region	Cropland [1]	Grassland pasture [2]	Forest land [3]	Other land	Total acreage	Percentage of land area
Maine	735	66	876	83	1, 760	8. 9
New Hampshire	198	23	360	32	613	10. 6
Vermont	867	191	792	66	1, 916	32. 3
Massachusetts	288	49	310	54	701	14. 0
Rhode Island	32	5	26	6	69	10. 2
Connecticut	252	54	192	43	541	17. 4
New York	6, 276	1, 190	2, 190	492	10, 148	33. 2
New Jersey	713	61	186	76	1, 036	21. 5
Pennsylvania	6, 065	565	1, 961	310	8, 901	30. 9
Delaware	533	10	121	10	674	53. 1
Maryland	1, 894	184	627	98	2, 803	44. 3
District of Columbia						
Northeast	17, 853	2, 389	7, 641	1, 270	29, 162	26. 0
Michigan	8, 682	499	1, 844	876	11, 901	32. 7
Wisconsin	12, 270	1, 264	4, 101	474	18, 109	52. 0
Minnesota	23, 380	1, 496	2, 844	1, 125	28, 845	56. 8
Lakes States	44, 332	3, 259	8, 789	2, 475	58, 855	48. 3
Ohio	12, 584	1, 413	2, 179	935	17, 111	65. 2
Indiana	14, 071	797	2, 141	564	17, 573	76. 1
Illinois	25, 466	1, 281	2, 296	870	29, 913	83. 8
Iowa	28, 398	2, 089	1, 630	1, 453	33, 570	93. 8
Missouri	21, 450	4, 139	5, 847	984	32, 420	73. 4
Corn Belt	101, 969	9, 719	14, 093	4, 806	130, 587	79. 2
North Dakota	30, 187	11, 278	422	1, 231	43, 118	97. 3
South Dakota	20, 844	24, 030	288	422	45, 584	93. 8
Nebraska	23, 379	21, 221	490	744	45, 834	93. 6
Kansas	32, 827	15, 212	777	574	49, 390	94. 4
Northern Plains	107, 237	71, 741	1, 977	2, 971	183, 926	94. 7
Virginia	4, 925	1, 623	3, 912	190	10, 650	41. 8
West Virginia	1, 763	863	1, 663	52	4, 341	28. 2
North Carolina	6, 480	875	5, 053	326	12, 734	40. 8
Kentucky	9, 810	1, 871	3, 823	464	15, 968	62. 9
Tennessee	8, 652	1, 444	4, 375	586	15, 057	56. 9
Appalachian	31, 630	6, 676	18. 826	1, 618	58, 750	47. 4

See footnote at end of table.

TABLE 2.—MAJOR USES OF LAND IN FARMS, BY STATE AND REGION, UNITED STATES, 1969—Continued

[Thousands of acres; excepting percentages]

State and region	Cropland [1]	Grassland pasture [2]	Forest land [3]	Other land	Total acreage	Percentage of land area
South Carolina	3, 663	447	2, 747	135	6, 992	36. 1
Georgia	7, 103	1, 275	6, 958	470	15, 806	42. 5
Florida	3, 773	5, 581	3, 814	864	14, 032	40. 5
Alabama	5, 885	1, 976	5, 320	473	13, 654	42. 1
Southeast	20, 424	9, 279	18, 839	1, 942	50, 484	40. 9
Mississippi	8, 394	2, 374	4, 841	431	16, 040	53. 0
Arkansas	10, 202	1, 893	3, 239	361	15, 695	47. 2
Louisiana	5, 962	1, 542	1, 916	369	9, 789	34. 0
Delta States	24, 558	5, 809	9, 996	1, 161	41, 524	45. 0
Oklahoma	16, 036	16, 599	2, 757	616	36, 008	81. 8
Texas	40, 007	91, 860	8, 733	1, 967	142, 567	85. 0
Southern Plains	56, 043	108, 459	11, 490	2, 583	178, 575	84. 3
Montana	16, 493	43, 887	1, 753	785	62, 918	67. 5
Idaho	6, 166	6, 758	972	521	14, 417	27. 2
Wyoming	2, 813	31, 584	504	575	35, 476	57. 0
Colorado	11, 105	23, 484	1, 479	629	36, 697	55. 3
New Mexico	2, 351	40, 772	2, 943	725	46, 791	60. 2
Arizona	1, 665	29, 447	5, 070	2, 020	38, 202	52. 6
Utah	1, 983	8, 791	230	309	11, 313	21. 5
Nevada	783	9, 669	34	222	10, 708	15. 2
Mountain	43, 359	194, 392	12, 985	5, 786	256, 522	46. 8
Washington	8, 278	5, 722	3, 108	451	17, 559	41. 2
Oregon	5, 145	10, 337	2, 030	506	18, 018	29. 3
California	10, 879	21, 254	2, 038	1, 551	35, 722	35. 7
Pacific	24, 302	37, 313	7, 176	2, 508	71, 299	34. 9
48 States	471, 707	449, 045	111, 812	27, 120	1, 059, 694	55. [illegible]
Alaska	18	1, 527	34	25	1, 604	. 4
Hawaii	372	987	167	532	2, 058	50. 1
U.S. total	472, 097	451, 559	112, 013	27, 677	1, 063, 346	47. 0

[1] Total cropland reported by the census of agriculture adjusted upward about 3 percent to compensate for underenumeration of cropland harvested.

[2] Grassland and other nonforested pasture exclusive of cropland pasture. Includes estimates of grassland pasture in class VI, part-time, part-retirement, and abnormal farms.

[3] As reported by the U.S. census of agriculture (May 1972).

TABLE 3.—MAJOR USES OF LAND NOT IN FARMS, BY STATE AND REGION, UNITED STATES, 1969

[Thousands of acres]

State and region	Pasture and range [1]	Forest land not grazed [2]	Other land [3]	Total [4]
Maine	116	16, 721	1, 192	18, 029
New Hampshire	38	4, 682	444	5, 164
Vermont	113	3, 578	324	4, 015
Massachusetts	4	3, 098	1, 206	4, 308
Rhode Island		403	199	602
Connecticut	3	1, 924	644	2, 571
New York	245	12, 567	7, 652	20, 464
New Jersey	1	2, 209	1, 567	3, 777
Pennsylvania	311	15, 650	3, 916	19, 877
Delaware	25	268	301	594
Maryland	118	2, 290	1, 119	3, 527
District of Columbia			39	39
Northeast	974	63, 390	18, 603	82, 967
Michigan	872	17, 223	6, 367	24, 462
Wisconsin	1, 373	10, 680	4, 695	16, 748
Minnesota	1, 048	15, 389	5, 463	21, 900
Lake States	3, 293	43, 292	16, 525	63, 110

See footnote at end of table.

TABLE 3.—MAJOR USES OF LAND NOT IN FARMS, BY STATE AND REGION, UNITED STATES, 1969—Continued

[Thousands of acres]

State and region	Pasture and range [1]	Forest land not grazed [2]	Other land [3]	Total [4]
Ohio	1,209	3,995	3,909	9,113
Indiana	1,293	1,677	2,559	5,529
Illinois	1,402	1,380	2,984	5,766
Iowa	383	237	1,612	2,232
Missouri	3,882	5,793	2,062	11,737
Corn Belt	8,169	13,082	13,126	34,377
North Dakota			1,221	1,221
South Dakota	736	675	1,616	3,027
Nebraska	1,268	231	1,616	3,115
Kansas	344	464	2,146	2,954
Northern Plains	2,348	1,370	6,599	10,317
Virginia	725	12,097	1,987	14,809
West Virginia	198	10,265	601	11,064
North Carolina	453	15,059	2,985	18,497
Kentucky	124	7,940	1,344	9,408
Tennessee	850	8,346	2,197	11,393
Appalachian	2,350	53,707	9,114	65,171
South Carolina	697	9,491	2,164	12,352
Georgia	116	18,083	3,162	21,361
Florida	5,651	8,541	6,394	20,586
Alabama	629	16,233	1,936	18,798
Southeast	7,093	52,348	13,656	73,097
Mississippi	4,595	7,946	1,688	14,229
Arkansas	5,192	10,808	1,550	17,550
Louisiana	8,732	5,826	4,408	18,966
Delta States	18,519	24,580	7,646	50,745
Oklahoma	4,981	1,188	1,843	8,012
Texas	14,188	4,033	6,978	25,199
Southern Plains	19,169	5,221	8,821	33,211
Montana	12,845	11,287	6,126	30,258
Idaho	19,889	12,484	6,123	38,496
Wyoming	16,776	2,932	7,026	26,734
Colorado	15,201	8,934	5,578	29,713
New Mexico	22,369	2,197	6,346	30,912
Arizona	23,138	1,119	10,128	34,385
Utah	29,898	694	10,636	41,228
Nevada	46,057	133	13,430	59,620
Mountain	186,173	39,780	65,393	291,346
Washington	3,486	15,405	6,155	25,046
Oregon	22,464	17,312	3,763	43,539
California	13,010	26,380	24,959	64,349
Pacific	38,960	59,097	34,877	132,934
48 States	287,048	355,867	194,360	837,275
Alaska	198	118,141	242,573	360,912
Hawaii	432	1,027	595	2,054
U.S. total	287,678	475,035	437,528	1,200,241

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[1] Estimated acreage of forested and nonforested grazing land not in farms including some acreages classified as usable but not necessarily grazed each year. The estimates are based on reports and records of the various land management and conservation agencies.

[2] Excludes reserved forest land in parks and other special uses.

[3] Other land not in farms includes various special uses of land and miscellaneous land generally having low value for agricultural purposes.

[4] Total land areas shown in appendix table 1 minus land in farms as reported by the U.S. Census of Agriculture (May 1972).

TABLE 4.—MAJOR USES OF CROPLAND, BY STATE AND REGION, UNITED STATES, 1969

[In thousands of acres]

State and region	Cropland used for crops[1]	Cropland used for soil improvements crops and idle[2]	Cropland used only for pasture[3]	Total cropland[4]
Maine	491	125	119	735
New Hampshire	126	16	56	198
Vermont	543	45	279	867
Massachusetts	199	17	72	288
Rhode Island	21	2	9	32
Connecticut	162	21	69	252
New York	4,060	724	1,492	6,276
New Jersey	510	107	96	713
Pennsylvania	4,264	647	1,154	6,065
Delaware	454	52	27	533
Maryland	1,374	224	296	1,89[illegible]
Northeast	12,204	1,980	3,669	17,853
Michigan	5,677	1,914	1,091	8,682
Wisconsin	8,944	1,225	2,101	12,270
Minnesota	16,886	4,393	2,101	23,380
Lake States	31,507	7,532	5,293	44,332
Ohio	8,790	2,068	1,726	12,584
Indiana	10,251	2,248	1,572	14,071
Illinois	20,310	2,977	2,179	25,466
Iowa	20,189	4,201	4,008	28,398
Missouri	11,178	2,871	7,401	21,450
Corn Belt	70,718	14,365	16,886	101,969
North Dakota	27,001	1,297	1,889	30,187
South Dakota	16,327	1,519	2,998	20,844
Nebraska	18,646	2,272	2,461	23,379
Kansas	26,339	2,563	3,925	32,827
Northern Plains	88,313	7,651	11,273	107,237
Virginia	2,629	564	1,732	4,925
West Virginia	754	123	886	1,763
North Carolina	4,032	1,335	1,113	6,480
Kentucky	3,572	1,322	4,916	9,810
Tennessee	3,771	1,100	3,781	8,652
Appalachian	14,758	4,444	12,428	31,630
South Carolina	2,326	643	694	3,663
Georgia	4,057	1,208	1,838	7,103
Florida	2,267	504	1,002	7,773
Alabama	2,889	896	2,100	5,885
Southeast	11,539	3,251	5,634	20,424
Mississippi	5,048	923	2,423	8,394
Arkansas	7,120	469	2,613	10,202
Louisiana	3,765	549	1,648	5,962
Delta States	15,933	1,941	6,684	24,558
Oklahoma	9,920	1,212	4,904	16,036
Texas	23,987	4,091	11,929	40,007
Southern Plains	33,907	5,303	16,833	56,043
Montana	14,473	579	1,441	16,493
Idaho	4,901	298	967	6,166
Wyoming	2,115	97	601	2,813
Colorado	8,826	890	1,389	11,105
New Mexico	1,371	467	513	2,351
Arizona	1,251	268	146	1,665
Utah	1,340	136	507	1,983
Nevada	573	48	162	783
Mountain	34,850	2,783	5,726	43,359

See footnote at end of table.

TABLE 4.—MAJOR USES OF CROPLAND, BY STATE AND REGION, UNITED STATES, 1969—Continued

[In thousands of acres]

State and region	Cropland used for crops [1]	Cropland used for soil improvements crops and idle [2]	Cropland used only for pasture [3]	Total cropland [4]
Washington	6, 989	455	834	8, 278
Oregon	3, 818	250	1, 077	5, 145
California	8, 242	793	1, 844	10, 879
Pacific	19, 049	1, 498	3, 755	24, 302
48 States	332, 778	50, 748	88, 181	471, 707
Alaska	14	1	3	18
Hawaii	176	160	36	372
U.S. total	332, 968	50, 909	88, 220	472, 097

[1] Includes cropland harvested, crop failure, and cultivated summer fallow. An upward adjustment of about 3 percent in the acreage of cropland harvested reported by the Census of Agriculture (May 1972) was made to conform with acreages of crops harvested estimated by the Statistical Reporting Service (December).

[2] Cropland in cover and soil improvement crops not harvested or pastured and other idle cropland based mainly on May 1972.

[3] Land in the crop rotation used only for pasture in 1969 as reported by May 1972.

[4] Total acreage in the crop rotation.

TABLE 5.—PASTURE IN FARMS, BY TYPE, STATE AND REGION, UNITED STATES, 1969

[In thousands of acres]

State and region	Cropland used only for pasture [1]	Open permanent pasture [2]	Forest land pasture [2]	Total
Maine	119	66	157	342
New Hampshire	56	23	71	150
Vermont	299	191	266	736
Massachusetts	72	49	81	202
Rhode Island	9	5	6	20
Connecticut	69	54	53	176
New York	1, 492	1, 190	683	3, 365
New Jersey	96	61	28	185
Pennsylvania	1, 154	565	520	2, 239
Delaware	27	10	20	57
Maryland	296	184	143	623
Northeast	3, 669	2, 398	2, 028	8, 095
Michigan	1, 091	499	620	2, 210
Wisconsin	2, 101	1, 264	2, 099	5, 464
Minnesota	2, 101	1, 496	1, 639	5, 236
Lake States	5, 293	3, 259	4, 358	12, 910
Ohio	1, 726	1, 413	848	3, 987
Indiana	1, 572	797	893	3, 262
Illinois	2, 179	1, 281	1, 182	4, 642
Iowa	4, 008	2, 089	1, 219	7, 316
Missouri	7, 401	4, 139	3, 893	15, 433
Corn Belt	16, 886	9, 719	8, 035	34, 640
North Dakota	1, 889	11, 278	264	13, 431
South Dakota	2, 998	24, 030	190	27, 218
Nebraska	2, 461	21, 221	321	24, 003
Kansas	3, 925	15, 222	434	19, 571
Northern Plains	11, 273	71, 741	1, 209	84, 223
Virginia	1, 732	1, 623	1, 179	4, 534
West Virginia	886	863	682	2, 431
North Carolina	1, 113	875	1, 129	3, 117
Kentucky	4, 916	1, 871	1, 398	8, 185
Tennessee	3, 781	1, 444	1, 682	6, 907
Appalachian	12, 428	6, 676	6, 070	25, 174

See footnote at end of table.

TABLE 5.—PASTURE IN FARMS, BY TYPE, STATE AND REGION, UNITED STATES, 1969—Continued

[In thousands of acres]

State and region	Cropland used only for pasture [1]	Open permanent pasture [2]	Forest land pasture [2]	Total
South Carolina	694	447	753	1,894
Georgia	1,838	1,275	2,140	5,253
Florida	1,002	5,581	2,736	9,319
Alabama	2,100	1,976	2,116	6,192
Southeast	5,634	9,279	7,745	22,658
Mississippi	2,423	2,374	2,649	7,446
Arkansas	2,613	1,893	1,866	6,372
Louisiana	1,648	1,542	981	4,171
Delta States	6,684	5,809	5,496	17,989
Oklahoma	4,904	16,599	2,325	23,828
Texas	11,929	91,860	7,737	111,526
Southern Plains	16,833	108,459	10,062	135,354
Montana	1,441	43,887	1,454	46,782
Idaho	967	6,758	770	8,495
Wyoming	601	31,584	448	32,633
Colorado	1,389	23,484	1,236	26,109
New Mexico	513	40,772	2,813	44,098
Arizona	146	29,447	5,059	34,652
Utah	507	8,791	179	9,477
Nevada	162	9,669	25	9,856
Mountain	5,726	194,392	11,984	212,102
Washington	834	5,772	2,388	8,944
Oregon	1,077	10,337	1,600	13,014
California	1,844	21,254	1,417	24,515
Pacific	3,755	37,313	5,405	46,473
48 States	88,181	449,045	62,392	599,618
Alaska	3	1,527	10	1,540
Hawaii	36	987	19	1,042
U.S. total	88,220	451,559	62,421	602,200

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[1] As reported by May 1972.

[2] Acreages in farms in economic classes 1-5 as reported by May 1972, plus estimated acreage in other farms.

TABLE 6.—TOTAL PASTURE AND RANGE, BY STATE AND REGION, UNITED STATES, 1969

[In thousands of acres]

State and region	Grassland [1]	Forest land [2]	Total [3]
Maine	293	165	458
New Hampshire	113	75	188
Vermont	569	280	849
Massachusetts	121	85	206
Rhode Island	14	6	20
Connecticut	123	56	179
New York	2, 787	823	3, 610
New Jersey	157	29	186
Pennsylvania	2, 003	547	2, 550
Delaware	61	21	82
Maryland	590	151	741
Northeast	6, 831	2, 238	9, 069
Michigan	2, 429	653	3, 082
Wisconsin	4, 627	2, 210	6, 837
Minnesota	4, 412	1, 872	6, 284
Lake States	11, 468	4, 735	16, 203
Ohio	4, 100	1, 096	5, 196
Indiana	3, 610	945	4, 555
Illinois	4, 793	1, 251	6, 044
Iowa	6, 097	1, 602	7, 699
Missouri	12, 234	7, 081	19, 315
Corn Belt	30, 834	11, 975	42, 809
North Dakota	13, 167	264	13, 431
South Dakota	27, 028	926	27, 954
Nebraska	24, 640	631	25, 271
Kansas	19, 378	537	19, 915
Northern Plains	84, 213	2, 358	86, 571
Virginia	4, 014	1, 245	5, 259
West Virginia	1, 749	880	2, 629
North Carolina	2, 329	1, 241	3, 570
Kentucky	6, 787	1, 522	8, 309
Tennessee	5, 976	1, 781	7, 757
Appalachian	20, 855	6, 669	27, 524
South Carolina	1, 673	918	2, 591
Georgia	3, 113	2, 256	5, 369
Florida	6, 836	8, 134	14, 970
Alabama	4, 510	2, 311	6, 821
Southeast	16, 132	13, 619	29, 751
Mississippi	5, 287	6, 754	12, 041
Arkansas	5, 508	6, 056	11, 564
Louisiana	4, 322	8, 581	12, 903
Delta States	15, 117	21, 391	36, 508
Oklahoma	21, 503	7, 306	28, 809
Texas	106, 679	19, 035	125, 714
Southern Plains	128, 182	26, 341	154, 523
Montana	51, 314	8, 313	59, 627
Idaho	23, 040	5, 344	28, 384
Wyoming	46, 512	2, 897	49, 409
Colorado	31, 100	10, 210	41, 310
New Mexico	51, 538	14, 929	66, 467
Arizona	41, 500	16, 290	57, 790
Utah	25, 400	13, 975	39, 375
Nevada	48, 800	7, 113	55, 913
Mountain	319, 204	79, 071	398, 275
Washington	7, 816	4, 614	12, 430
Oregon	23, 833	11, 645	35, 478
California	24, 700	12, 825	37, 525
Pacific	56, 349	29, 084	85, 433
48 States	689, 185	197, 481	886, 666
Alaska	1, 627	111	1, 738
Hawaii	1, 023	451	1, 474
U.S. total	691, 835	198, 043	889, 878

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[1] Cropland used only for pasture, and permanent grassland pasture and range.
[2] Woodland pasture in farms, plus an approximation of forested grazing land not in farms.
[3] Total pasture and range in farms, plus estimates of usable grazing land not in farms.

Note: Estimates based on reports and records of May 1972 and Federal and State land management and conservation agencies.

TABLE 7.—FEDERAL PASTURE AND RANGE, BY TYPE, STATE AND REGION, UNITED STATES, 1969

[Thousands of acres]

State and region	Grassland range[1]	Forest and woodland[2]	Other range[3]	Total Federal range[4]
North Dakota	1,154	124	4	1,282
South Dakota	1,641	295	700	2,636
Nebraska	418	61	2	481
Kansas	168		10	198
Northern Plains	3,401	480	716	4,597
Oklahoma	194	238	50	482
Texas	617	678	55	1,350
Southern Plains	811	916	105	1,832
Montana	8,986	3,868	3,976	16,830
Idaho	14,589	3,043	6,811	24,443
Wyoming	19,179	1,534	4,043	24,756
Colorado	8,735	5,084	7,436	21,255
New Mexico	13,077	6,432	3,365	22,874
Arizona	15,497	6,545	3,805	25,847
Utah	14,976	9,622	6,154	30,752
Nevada	41,077	6,828	4,352	52,257
Mountain	136,116	42,956	3[illegible],942	219,014
Washington	789	1,110	3,169	5,068
Oregon	12,458	7,077	4,504	24,039
California	9,513	3,716	7,327	20,556
Pacific	22,760	11,903	15,000	49,663
17 Western States	163,088	56,255	55,763	275,106
31 Eastern States	416	3,333	1,283	5,032
48 States	163,504	59,588	57,046	280,138
Alaska	1,338	100		1,438
Hawaii	4			4
U.S. total	164,846	59,688	57,046	281,580

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[1] An approximation of grassland, shrub, and brushland (not classified as forest) used or usable for livestock grazing.

[2] An approximation of open forest range used or usable for grazing.

[3] Densely forested and other areas in National Forest system range allotments and Federal grazing districts, having little utility for grazing but which form part of the total range environment. This acreage is omitted from pasture and range acreages shown elsewhere in this publication.

[4] Approximate range, assembled from data of the principal Federal land-administering agencies.

TABLE 8.—STATE LAND USED FOR FARMING AND GRAZING, UNITED STATES, 1968

[In thousands of acres]

State and region	Farming[1]	Grazing[1]	Total[2]
North Dakota	22	801	823
South Dakota		1, 240	1, 240
Nebraska	321	1, 285	1, 606
Kansas			
Northern Plains	343	3, 326	3, 669
Oklahoma	304	456	760
Texas	31	2, 647	2, 678
Southern Plains	335	3, 103	3, 438
Montana	491	4, 158	4, 649
Idaho	56	1, 713	1, 769
Wyoming		3, 648	3, 648
Colorado	169	2, 720	2, 871
New Mexico	116	10, 731	10, 847
Arizona	312	8, 828	9, 140
Utah		3, 586	3, 586
Nevada			
Mountain	1, 144	35, 366	36, 510
Washington	138	1, 117	1, 255
Oregon		645	645
California		68	68
Pacific	138	1, 830	1, 968
17 Western States	1, 960	43, 625	45, 585
Other States	329	473	802
U.S. total	2, 289	44, 098	46, 387

[1] Approximate acreage leased out for purpose indicated.

[2] Includes a small amount classified as forested grazing land.

Source: Data supplied by the Public Land Law Review Commission.

TABLE 9.—FOREST LAND IN FARMS AND NOT IN FARMS, BY STATE AND REGION, UNITED STATES, 1969

[In thousands of acres]

State and region	In farms [1]	Not in farms	Total [2]
Maine	876	16, 872	17, 748
New Hampshire	360	4, 771	5, 131
Vermont	792	3, 599	4, 391
Massachusetts	310	3, 210	3, 520
Rhode Island	26	407	433
Connecticut	192	1, 994	2, 186
New York	2, 190	15, 187	17, 377
New Jersey	186	2, 277	2, 463
Pennsylvania	1, 961	15, 871	17, 832
Delaware	121	270	391
Maryland	627	2, 333	2, 960
District of Columbia			
Northeast	7, 641	66, 791	74, 432
Michigan	1, 844	17, 429	19, 273
Wisconsin	4, 101	10, 844	14, 945
Minnesota	2, 844	16, 140	18, 984
Lake States	8, 789	44, 413	53, 202
Ohio	2, 179	4, 319	6, 498
Indiana	2, 141	1, 767	3, 908
Illinois	2, 296	1, 493	3, 789
Iowa	1, 630	825	2, 455
Missouri	5, 847	9, 072	14, 919
Corn Belt	14, 093	17, 476	31, 569
North Dakota	422		422
South Dakota	288	1, 445	1, 733
Nebraska	490	555	1, 045
Kansas	777	566	1, 343
Northern Plains	1, 977	2, 566	4, 543
Virginia	3, 912	12, 477	16, 389
West Virginia	1, 663	10, 509	12, 172
North Carolina	5, 053	15, 560	20, 613
Kentucky	3, 823	8, 145	11, 968
Tennessee	4, 375	8, 761	13, 136
Appalachian	18, 826	55, 452	74, 278
South Carolina	2, 747	9, 746	12, 493
Georgia	6, 958	18, 587	25, 545
Florida	3, 814	14, 118	17, 932
Alabama	5, 320	16, 450	21, 770
Southeast	18, 839	58, 901	77, 740
Mississippi	4, 841	12, 072	16, 913
Arkansas	3, 239	15, 038	18, 277
Louisiana	1, 916	13, 464	15, 380
Delta States	9, 996	40, 574	50, 570
Oklahoma	2, 757	6, 583	9, 340
Texas	8, 733	15, 358	24, 091
Southern Plains	11, 490	21, 941	33, 431
Montana	1, 753	21, 024	22, 777
Idaho	972	20, 619	21, 591
Wyoming	504	9, 581	10, 085
Colorado	1, 479	21, 055	22, 534
New Mexico	2, 943	15, 370	18, 313
Arizona	5, 070	13, 513	18, 583
Utah	230	15, 058	15, 288
Nevada	34	7, 626	7, 660
Mountain	12, 985	123, 846	136, 831
Washington	3, 108	19, 990	23, 098
Oregon	2, 030	28, 374	30, 404
California	2, 038	40, 370	42, 408
Pacific	7, 176	88, 734	95, 910
48 States	111, 812	520, 694	632, 506
Alaska	34	119, 017	119, 051
Hawaii	167	1, 807	1, 974
U.S. total	112, 013	641, 518	753, 531

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[1] As reported by the Census of Agriculture (May 1972).

[2] Total forest land, including reserved areas duplicated in parks and other special uses of land, as reported by the U.S. Forest Service (September).

TABLE 10.—LAND IN SPECIAL-USE AREA, BY STATE AND REGION, UNITED STATES, 1969

[Thousands of acres]

State and region	Urban areas [1]	Rural transportation areas [2]	Rural parks [3]	Wildlife refuge [4]	National defense and industrial areas [5]	State institutional and miscellaneous uses [6]	Farmsteads, farm roads and lanes [7]	Total
Maine	235	187	288	48	21	8	20	807
New Hampshire	172	80	16	6	7	7	6	294
Vermont	59	75	13	69	12	6	16	250
Massachusetts	955	91	79	25	26	30	13	1, 219
Rhode Island	154	10	11	8	7	9	2	201
Connecticut	536	59	24	13	1	11	10	654
New York	1, 778	571	2, 942	161	173	48	123	5, 796
New Jersey	1, 201	111	54	104	66	18	19	1, 573
Pennsylvania	1, 549	684	293	1, 066	31	51	136	3, 810
Delaware	86	30	6	39	4	10	8	183
Maryland	518	139	69	79	127	16	33	981
District of Columbia	39							39
Northeast	7, 282	2, 037	3, 795	1, 681	475	214	38[illegible]	15, 807
Michigan	1, 387	975	799	388	26	41	263	3, 879
Wisconsin	843	897	39	635	69	17	330	2, 830
Minnesota	810	1, 136	897	679	5	10	415	3, 952
Lake States	3, 040	3, 008	1, 735	1, 702	100	68	1, 008	10, 661
Ohio	1, 796	605	96	89	45	31	376	3, 038
Indiana	852	508	51	70	185	8	333	2, 007
Illinois	1, 539	1, 080	58	105	64	28	415	3, 289
Iowa	570	845	35	123	20	19	492	2, 104
Missouri	837	689	150	145	75	31	451	2, 378
Corn Belt	5, 594	3, 727	390	532	389	117	2, 067	12, 816
North Dakota	84	683	76	327	33	18	248	1, 469
South Dakota	106	742	351	145	248	10	219	1, 821
Nebraska	214	936	30	174	37	22	306	1, 719
Kansas	429	1, 134	34	69	172	34	362	2, 234
Northern Plains	833	3, 495	491	715	490	84	1, 135	7, 243
Virginia	774	366	309	150	193	33	136	1, 961
West Virginia	197	191	62	70	2	25	50	597
North Carolina	823	626	436	288	289	26	205	2, 693
Kentucky	444	487	110	54	168	34	227	1, 524
Tennessee	784	439	398	[illegible]2	190	3[illegible]	224	2, 236
Appalachian	3, 022	2, 109	1, 315	724	842	157	842	9, 011

See footnotes at end of table.

TABLE 10.—LAND IN SPECIAL-USE AREA, BY STATE AND REGION, UNITED STATES, 1969—Continued

[Thousands of acres]

State and region	Urban areas [1]	Rural transportation areas [2]	Rural parks [3]	Wildlife refuge [4]	National defense and industrial areas [5]	State institutional and miscellaneous uses [6]	Farmsteads, farm roads and lanes [7]	Total
South Carolina	490	447	64	163	298	50	102	1, 614
Georgia	963	545	56	428	549	51	155	2, 747
Florida	1, 587	714	1, 056	255	703	364	115	4, 794
Alabama	792	612	50	39	179	87	150	1, 909
Southeast	3, 832	2, 318	1, 226	885	1, 729	552	522	11, 064
Mississippi	439	404	50	78	21	75	223	1, 290
Arkansas	401	414	27	341	95	21	202	1, 501
Louisiana	592	364	13	495	149	20	170	1, 803
Delta States	1, 432	1, 182	90	914	265	116	595	4, 594
Oklahoma	557	628	73	342	183	60	299	2, 142
Texas	2, 731	1, 677	1, 095	351	480	224	468	7, 026
Southern Plains	3, 288	2, 305	1, 168	693	663	284	767	9, 168
Montana	93	733	3, 116	279	16	40	128	4, 405
Idaho	122	286	2, 745	87	691	18	102	4, 051
Wyoming	61	375	4, 674	85	26	8	53	5, 282
Colorado	365	704	1, 400	189	297	34	132	3, 121
New Mexico	252	408	1, 273	332	2, 832	33	59	5, 189
Arizona	435	326	3, 603	113	3, 577	11	37	8, 102
Utah	273	269	2, 244	314	1, 882	15	53	5, 050
Nevada	135	496	927	1, 701	3, 964	6	14	7, 243
Mountain	1, 736	3, 597	19, 982	3, 100	13, 285	165	578	42, 443
Washington	667	363	3, 073	498	756	22	119	5, 498
Oregon	362	421	988	553	66	27	103	2, 520
California	3, 302	1, 143	7, 019	183	3, 828	86	273	15, 834
Pacific	4, 331	1, 927	11, 080	1, 234	4, 650	135	495	23, 852
48 States	34, 390	25, 705	41, 272	12, 117	22, 888	1, 892	8, 395	146, 659
Alaska	59	208	7, 784	19, 937	2, 523	15	3	30, 529
Hawaii	141	40	225	2	176	11	22	617
U.S. total	34, 590	25, 953	49, 281	32, 056	25, 587	1, 918	8, 420	177, 805

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[1] Areas of urbanized areas and other incorporated and unincorporated places of 1,000 population or more. Estimates are based on area data for urban places developed in conjunction with the 1970 Census of Population (June) but differs in that (1) census reported areas were substantially adjusted to minimize the inclusion of vacant land, and (2) places of 1,000 to 2,500 population are included.

[2] Includes rural highways and roads, railroads, and airports. Estimates of area in highways were derived by applying average right-of-way widths reported by State highway departments to the mileage in different highway systems reported by the Federal Highway Administration. Estimates of acreage in railroad rights-of-way are based on State-by-State changes in mileage reported by the Interstate Commerce Commission. Estimates of acreage in airports based on information on active airports supplied by the Federal Aviation Administration. Excludes airports used strictly for personal or military use.

[3] Areas in National and State park systems and National Forest wilderness and primitive areas plus 2,700,000 acres in New York classified as State forest preserves. Excludes, in most instances, parks in urban places and large water bodies. Based on data from reports and records of the National Park Service, U.S. Forest Service, Public Land Law Review Commission, and individual State agencies.

[4] Areas administered by the U.S. Fish and Wildlife Service and State wildlife agencies. Does not include Federal areas under the primary jurisdiction of another agency or leased for wildlife purposes. Data are from reports and records of the U.S. Fish and Wildlife Service, Public Land Law Review Commission, and individual State agencies.

[5] As reported by the Bureau of Land Management (July). Includes land administered by the Department of Defense for military purposes (23,500,000 acres) and land administered by the Atomic Energy Commission (2,100,000 acres).

[6] Incomplete data on State-owned rural land held for educational, welfare, correctional, and other institutional purposes and miscellaneous uses such as National Guard camps, fairgrounds, radio stations, gravel pits, and water-storage areas.

[7] Estimates calculated on the basis of State-by-State number of farms and acreage of unclassified land in farms

TABLE 11.—CROPLAND USED FOR CROPS AND CROP PRODUCTION PER ACRE, 48 STATES, 1909–72

[In million of acres]

Year	Cropland harvested [1]	Crop failure [2]	Summer fallow [3]	Total cropland used for crops	Index 1967 = 100 [4]
1909	311	9	4	324	95
1910	317	9	4	330	97
1911	322	10	5	337	99
1912	320	12	5	337	99
1913	324	11	5	340	100
1914	326	11	5	342	101
1915	332	11	5	348	102
1916	332	11	5	348	102
1917	341	11	5	357	105
1918	353	12	5	370	109
1919	355	14	5	374	110
1920	351	12	5	368	108
1921	350	12	6	368	108
1922	346	13	6	365	107
1923	345	14	6	365	107
1924	346	13	6	365	107
1925	351	12	7	370	109
1926	350	14	8	372	109
1927	349	15	9	373	110
1928	352	14	10	376	110
1929	356	13	10	379	111
1930	360	11	11	382	112
1931	356	17	11	384	113
1932	361	11	12	384	113
1933	331	33	14	378	111
1934	296	64	13	375	110
1935	33[illegible]	25	16	377	111
1936	314	43	18	375	110
1937	338	21	20	379	111
1938	340	13	19	372	109
1939	321	21	21	363	106
1940	33[illegible]	16	21	837	106
1941	335	12	20	367	107
1942	339	11	20	370	108
1943	348	12	17	377	118
1944	353	10	16	379	110
1945	345	9	18	372	100
1946	343	8	18	369	108
1947	346	8	19	373	109
1948	348	9	21	378	110
1949	352	9	26	387	113
1950	337	11	29	377	110
1951	336	17	28	381	111
1952	341	11	28	[illegible]	111
1953	341	13	26	380	111
1954	339	13	28	380	111
1955	333	16	29	378	110
1956	317	22	30	369	107
1957	316	12	30	358	104
1958	316	9	30	355	103
1959	317	10	31	358	104
1960	317	6	32	355	104
1961	296	11	33	340	99
1962	287	10	34	331	97
1963	291	10	36	337	98
1964	292	6	37	335	98
1965	292	6	38	336	99
1966	289	5	38	332	98
1967	301	7	32	340	100
1968	296	6	33	335	98
1969	286	6	41	333	98
1970	289	5	38	332	97
1971	301	5	34	340	100
1972	290	6	38	334	98

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[1] Includes land from which 1 or more crops were harvested. Estimates are based on data from (May 1911–72) and annual estimates of crops harvested made by the Statistical Reporting Service and predecessor agencies.

[2] Estimates based on acreages reported by (May 1925–45; 1964–69) and annual estimates of crops not harvested by the Statistical Reporting Service and predecessor agencies.

[3] Estimates for the 17 Western States only. Acreages are variously based on data from the censuses of agriculture, Statistical Reporting Service, and, in earlier years, the Great Plains Council.

[4] Index numbers computed from unrounded data

TABLE 12.—CROPS HARVESTED, 48 STATES, CENSUS YEARS 1954–69 [1]

[Million acres]

Item	1954	1959	1964	1969
Food crops:				
Food grains:				
Wheat	54.4	51.8	49.8	47.1
Rice	2.5	1.6	1.8	2.1
Rye	1.8	1.5	1.7	1.3
Buckwheat	.1	.1	(2)	(2)
Total, food grains	58.8	55.0	53.3	50.5
Irish potatoes	1.4	1.3	1.3	1.4
Sweetpotatoes	.3	.3	.2	.1
Dry beans	1.5	1.5	1.4	1.5
Dry peas	.3	.3	.3	.2
Cowpeas for peas	.3	.2	.1	(2)
Sugarcane, all	.4	.3	.6	.5
Sugarbeets	.9	.9	1.4	1.5
Peanuts for nuts	1.4	1.5	1.4	1.5
Soybeans for beans	17.0	22.6	30.8	41.3
Fruits and planted nuts [3]	4.5	4.6	4.6	4.4
Principal commercial vegetables	3.8	3.4	3.3	3.3
Total, food crops	90.6	91.9	98.7	106.2
Feed crops:				
Feed grains:				
Corn	80.2	81.9	65.4	63.1
Oats	40.6	27.8	19.8	18.0
Barley	13.4	14.9	10.3	9.6
Sorghums, all	18.1	19.0	15.8	16.8
Total, feed grains	152.3	143.6	111.3	107.5
All hay:				
Tame	59.6	55.0	56.8	51.4
Wild	12.9	10.8	10.5	8.3
Total, hay	72.5	65.8	67.3	59.7
Total, feed crops	224.8	209.4	178.6	167.2
Other crops:				
Cotton	19.3	15.1	14.1	11.1
Flaxseed	5.7	2.9	2.8	2.6
Tobacco	1.7	1.2	1.1	.9
Broomcorn	.3	.2	.2	.1
Sweetclover seed	.3	.1	.1	.1
Timothy seed	.3	.3	.2	.2
Minor crops [4]	3.8	3.2	2.6	2.4
Total, other crops	31.4	23.0	21.1	17.4
Total, crops harvested [5]	346.8	324.3	298.4	290.8

[1] The principal crop acreages harvested are as reported in field crops (December and related reports by the Statistical Reporting Service. Acreages of fruit and planted nuts and some minor crops are based on the Censuses of Agriculture (May 1954, 1959, 1964, and 1969).

[2] Estimates discontinued.

[3] Includes tree fruits, small fruits, and planted nut trees as reported by (May 1954, 1959, 1964, and 1969).

[4] Consists of allowances for certain vegetables and field crops not included in the 59 principal crops and various legumes and other crops harvested by livestock.

[5] Includes acreages of some crops harvested in succession from the same land, but excludes duplication in alfalfa, red clover, and lespedeza harvested for both hay and seed and peanuts harvested for both hay and nuts.

TABLE 13.—IRRIGATED LAND IN FARMS, 17 WESTERN STATES AND UNITED STATES, CENSUS YEARS, 1949-69

[In thousands of acres]

State and region	1949	1954	1959	1964	1969
North Dakota	35	38	48	51	63
South Dakota	78	90	116	130	150
Nebraska	876	1, 171	2, 078	2, 169	2, 857
Kansas	139	332	762	1, 004	1, 522
Northern Plains	1, 128	1, 631	3, 004	3, 354	4, 592
Oklahoma	34	108	198	302	524
Texas	3, 132	4, 707	5, 656	6, 385	6, 888
Southern Plains	3, 166	4, 815	5, 854	6, 687	7, 412
Montana	1, 717	1, 891	1, 875	1, 893	1, 841
Idaho	2, 137	2, 325	2, 577	2, 802	2, 760
Wyoming	1, 432	1, 263	1, 470	1, 571	1, 523
Colorado	2, 872	2, 263	2, 685	2, 690	2, 895
New Mexico	655	650	732	813	823
Arizona	964	1, 177	1, 152	1, 125	1, 178
Utah	1, 138	1, 073	1, 062	1, 092	1, 025
Nevada	727	567	543	823	753
Mountain	11, 642	11, 209	12, 096	12, 810	12, 798
Washington	589	778	1, 007	1, 150	1, 224
Oregon	1, 307	1, 490	1, 384	1, 608	1, 519
California	6, 438	7, 048	7, 396	7, 599	7, 240
Pacific	8, 334	9, 316	9, 787	10, 357	9, 983
17 Western States	24, 270	26, 971	30, 741	33, 208	34, 785
Other States	1, 635	2, 581	2, 423	3, 848	4, 344
U.S. total	25, 905	29, 552	33, 164	37, 056	39, 129

Source: U.S. Census of Agriculture (May 1950, 1954, 1959, 1964, and 1969).

LAND USE CHANGE IN THE SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, 1950–69

URBANIZATION OF LAND IN THE NORTHEASTERN UNITED STATES

URBANIZATION OF LAND IN THE WESTERN STATES

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LAND USE CHANGE IN THE SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, 1950–69

AN ANALYSIS BASED ON REMOTE SENSING

[By H. Thomas Frey, Geographer and Henry W. Dill, Jr., Physical Science Analyst, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture]

INTRODUCTION

Land clearing for crop use has been an important activity in the Southern Mississippi Alluvial Valley for many years, although the rate of clearing has varied over time and within the region, depending on economic conditions and local circumstances. The process accelerated in recent years, apparently in response to a favorable relationship between costs of land clearing and market demand for soybeans. However, conventional methods of data collection have not provided the detailed information required by agricultural specialists to accurately assess the impact of recent land clearing on agricultural production and the environment. Recent advances in remote sensing suggested the feasibility of a high-altitude aerial photographic survey to obtain additional data on land clearing and use in the region.

For the survey, imagery with both high quality and large area coverage per print, as attainable from high-altitude flight, was desired. Imagery of this type taken in 1969 was compared with conventional imagery of the same area obtained in 1950 to identify and measure land use for the respective years and specific shifts in use during the interval between surveys. Observations were made of sample points at the frequency of one per square mile. Six categories of use were identified: (1) cropland, (2) grassland, (3) transitional, (4) forest, (5) urban and built-up, and (6) other. Acreages used for crops and forest and the changing ratio between these acreages due to land clearing were of particular interest.

STUDY AREA DEFINED

The study area comprises, wholly or partially, 98 counties in Arkansas, Louisiana, Mississippi, Missouri, Tennessee, and Kentucky, as outlined in figure 1. Forty-one of these counties are located entirely within the boundaries of the Mississippi Alluvial Valley. A portion of each of the remaining 57 counties, ranging from less than 5 percent to more than 90 percent, also is within the river's flood or deltaic plain (table 1).

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FIGURE 1. – The Southern Mississippi Alluvial Valley

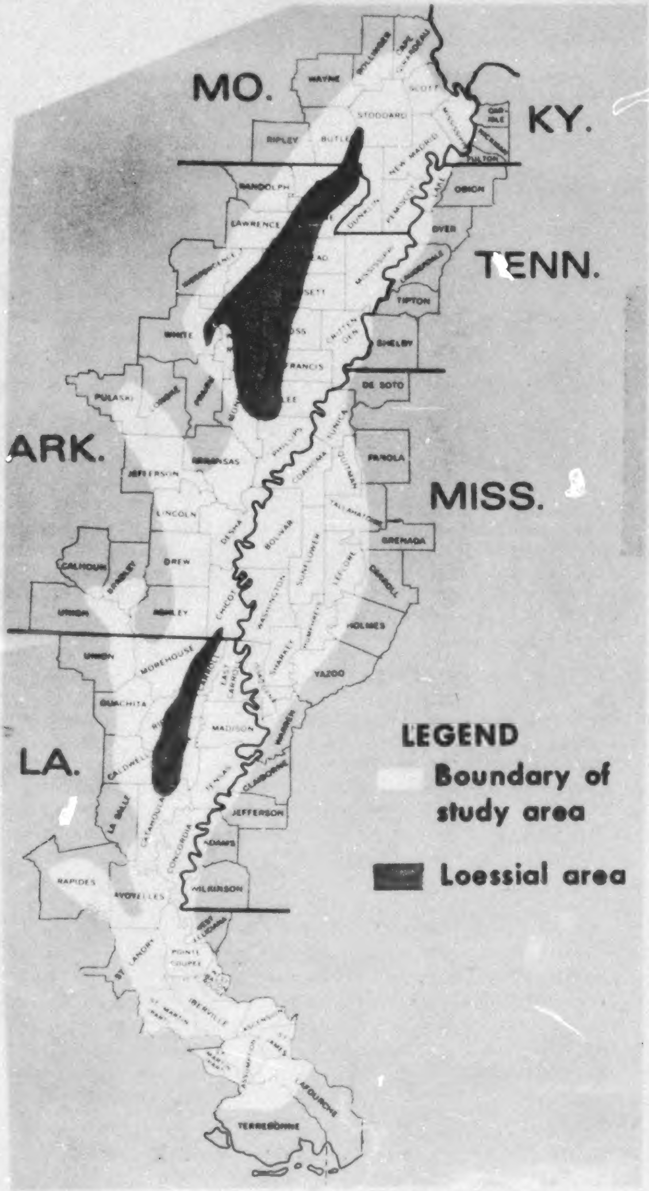


TABLE 1.—DISTRIBUTION OF COUNTRIES BY STATE, AND PERCENTAGE OF AREA IN STUDY AREA

[Number of counties]

State	Total counties	Percentage of area in study area				
		100	75 to 99	50 to 74	25 to 49	Less than 25
Arkansas	30	12	3	4	4	7
Louisiana	26	14	2	2	4	4
Mississippi	22	10	1		4	7
Missouri	11	4	2	1		4
Tennessee	6	1			2	3
Kentucky	3				1	2
Total	98	41	8	7	15	27

Except for two departures, the boundaries of the study area are identical to those used by the Soil Conservation Service to delineate the Southern Mississippi Alluvial Valley. In one departure, two enclavelike areas characterized by loessial soils and elevations now above flood level are included as part of the valley, although the Soil Conservation Service considers them separate areas. For the most part, land use and development activities in these areas closely resemble those in the surrounding alluvial plain (fig. 1).

In the second departure, the alluvial portions of several parishes in Louisiana were omitted because of incomplete photo coverage. These parishes extend both east and west from the study area at the points indicated by major breaks in the study area boundary (fig. 1). Their inclusion would neither greatly enlarge the study area nor significantly affect the acreage of land cleared.

The study area encompasses 24.3 million acres (table 2). Two-thirds of this total is in Arkansas and Louisiana which have 8.9 and 7.3 million acres, respectively; one-fifth (4.9 million acres) is in Mississippi, and one-tenth (2.5 million acres) is in Missouri. Tennessee and Kentucky, where alluvial deposits are limited to a relatively narrow strip along the river, together contribute the remaining 0.5 million acres, or 2 percent of the area. Louisiana's acreage would be somewhat larger if the alluvial portions of several omitted parishes referred to above were included.

TABLE 2.—ACREAGE DISTRIBUTION IN THE SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, BY STATE

State	Area	
	Acres (thousands)	Percent
Arkansas	8,888	37
Louisiana	7,276	30
Mississippi	4,892	20
Missouri	2,492	10
Tennessee	451	2
Kentucky	80	(1)
Total	24,079	100

[1] Less than 0.5 percent.

CHARACTERISTICS OF THE STUDY AREA

The Southern Mississippi Alluvial Valley is relatively homogeneous in terms of physical features and agricultural activity. Because of the natural slope away from the aggrading Mississippi River, subordinate streams drain to form a limited number of tributaries such as the Yazoo, St. Francis, and Red Rivers. In general, basins of the respective tributaries are characterized by alternating low ridges or natural levees, formed and then abandoned as the main river channel migrated, and intervening depressions. This relief configuration retards drainage of surface water. It also reflects local variation in the composition and workability of the alluvial soils.

Although a low ridge-plain relief predominates, surface features are not uniform throughout the valley. Among the notable exceptions are several elongated strips of dissected highlands. Crowley's Ridge, the largest, is only a few miles wide but extends from the vicinity of Cairo, Ill. to Helena, Ark., a distance of some 200 miles. Geologically, these highlands have always been above flood level. They are covered with loessial rather than alluvial deposits.

Alluvial loess-covered terraces now above flood level also occur in the valley. One particularly large area of this nature extends from Stoddard County, Mo., to Phillips County, Ark., comprising significant parts of the several intervening counties. Another extends from Chicot County, Ark., to the Catahoula-Franklin parish boundary in Louisiana. These loessial terraces have flat, poorly drained, interstream surfaces but lack the ridge-depression features of the alluvial plain. Their boundaries with the lower lying alluvium are usually photographically distinguishable, except in forested areas, by contrasting field patterns and, sometimes, by a visible escarpment.

Climatically, the Southern Mississippi Alluvial Valley possesses a warm lengthy growing season with plentiful rainfall. The frost-free period ranges from about 200 days in the north to 280 days in the south, depending on latitudinal and elevational differences and land-water relationships.

The physical resources of the valley have combined to favor the development of a highly mechanized system of cash-crop agriculture. Over its relatively long history of settlement, extensive areas of forest have been cleared, drained, and placed in cultivation. In terms of acreage, the leading crop is soybeans; cotton ranks second. These two crops are grown throughout the valley and account for about three-fourths of the acreage harvested. Rice and sugarcane are important in the Arkansas and Louisiana components, respectively, and corn is important in the Missouri component.

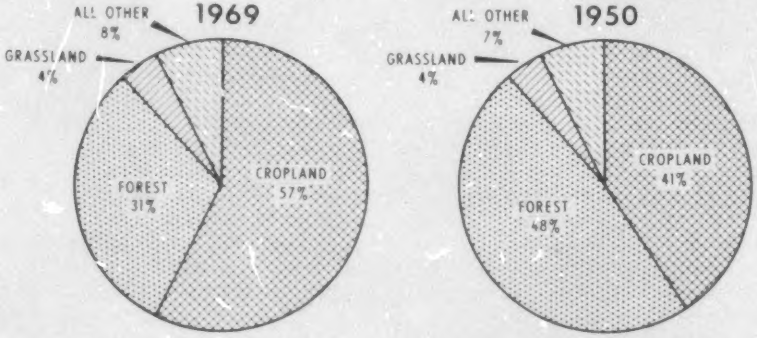
LAND USE IN THE STUDY AREA

Land clearing for crop and other uses began in the study area when French settlers first occupied portions of Louisiana. The process has continued at irregular rates, waxing and waning in association with flood control and drainage activities, economic conditions, and other factors. Changes between 1950 and 1969 as reflected in aerial photographs for those 2 years are summarized in the text, tables, and figures which follow.

TABLE 3.—MAJOR LAND USES, SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, 1950-69

Major land use	1969		1950		Change	
	Acres (1,000)	Percent	Acres (1,000)	Percent	Acres (1,000)	Percent
Cropland	13, 710	57	9, 963	41	3, 747	38
Grassland	1, 094	4	958	4	136	14
Transition	157	1	129	1	28	22
Forest	7, 457	31	11, 520	48	−4, 063	−35
Urban	447	2	365	1	82	22
Other	1, 214	5	1, 144	5	60	6
Total	24, 079	100	24, 079	100		

FIGURE 2.—Major Land Uses, Southern Mississippi Alluvial Valley



In 1969, cropland totaled 13.7 million acres or 57 percent of the land area and, thus, is well established as the dominant land use in the Southern Mississippi Alluvial Valley (table 3 and fig. 2). Forest, which originally covered almost all of the region, has now been reduced to 7.5 million acres or 31 percent of the study area. The remaining 12 percent of the area is distributed among grassland (4 percent), transitional (1 percent), urban and built-up (2 percent), and miscellaneous (5 percent).

Two decades earlier, forest land predominated with 11.5 million acres or 48 percent of the land area; cropland was in the secondary position with 10.0 million acres or 41 percent of the area. All other uses of land collectively accounted for 2.6 million acres or 11 percent of the area in 1950. These included grassland (4 percent), transitional (1 percent), urban and built-up (1 percent), and miscellaneous (5 percent).

Net changes in land use, 1950-69

Comparison of data for the two inventory dates reveals that in both years, cropland and forest collectively accounted for more than four-fifths of the area in the region, easily dominating all other uses. However, the relative positions of these two use categories were dramatically reversed between 1950 and 1969. Forest occupied 48 percent of the area in 1950, but its acreage had been reduced to 31 percent by 1969. Conversely, cropland occupance increased from 41 percent to a dominant 57 percent during the study period.

The 3.7 million acre increase in cropland and 4.1 million acre decrease in forest land represented respective shifts in these uses of 16 percent and 17 percent of the total land area, an average approaching 1 percent per year.

Acreages classified as grassland, transitional, urban and built-up, and miscellaneous all increased between 1950 and 1969. None of these increases were large in absolute terms, although some were significant as percentages. Also, the relative positions of these uses within the region remained about the same. Thus, most of the decrease in forest land is attributable to land clearing for crop use, although other uses underwent some expansion at the expense of forest land as well.

Specific changes in land use

In addition to the familiar net change measurements, the use of sequential photographic imagery taken at two different points in time permitted the measurement of shifts from one specific land use to another. The results obtained in this study by comparing each observation point on the 1969 imagery with its counterpart of the 1950 imagery are summarized in table 4.

Using cropland as an example, only 9.6 million of the 13.7 million acres observed in 1969 were used for crops in 1950. Uses of the remainder in 1950 were: forest, 3.8 million acres; grassland, 219,000 acres; transitional, 61,000 acres; and other land, 10,000 acres. Similarly, part of the nearly 10.0 million acres used for crops in 1950 subsequently shifted to other uses. Of this acreage, 186,000 acres shifted to grassland; 93,000 acres were in a transitional stage; 20,000 acres reverted to forest; 46,000 acres went to urban uses, and 17,000 acres were converted to roads, drainage ditches, and other miscellaneous uses. The 3.7 million acre increase in total cropland represents the net effect of these shifts or interchanges of land among uses.

TABLE 4.—SPECIFIC CHANGES IN LAND USE, SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, 1950–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage					
		Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	13,710	9,601	219	61	3,818	1	10
Grassland	1,095	186	686	13	209		1
Transition	157	93	22	24	18		
Forest	7,457	20	20	28	7,386	1	2
Urban	447	46	9	2	28	362	
Other	1,213	17	2	1	61	1	1,131
Total	24,079	9,963	958	129	11,520	365	1,144

Somewhat surprisingly, 209,000 acres of forest land shifted to grassland between 1950 and 1969. This increase may be attributable to added emphasis on grazing. Probably, it comprises acreage cleared for crops but later found to be more suitable for pasture. In any case, grassland increased on net only 137,000 acres, reflecting other offsetting shifts, mainly from grassland to cropland.

Overall, each of the agricultural and forestry uses experienced at least some interchange of land with each other. The urban and miscellaneous other categories were more resistant to encroachment by other uses, but the latter experienced modest interchange with some uses. Of the five nonforest categories of use, all except the transitional category gained in exchange of area with forest land.

Land use between levee and river

Much of the land in the study area is afforded considerable protection from flood by an extensive system of manmade levees. Interest has arisen as to the extent and use of unprotected land inside levees. In response, interpretations of observation points falling between the levee and the river, and on similar strips of flood plain too narrow to warrant levee construction, were recorded separately.

The observations of unprotected land, including areas inside the levees of both the Mississippi and tributary streams, are summarized in table 5. The 1.8 million acres in this class represent 7 to 8 percent of the total area in the study area. Included in this acreage are approximately 1.5 million acres inside levees and 0.3 million acres in narrow strips bounded on one side by bluffs.

Forest remains the dominant use of this unprotected land despite significant clearing since 1950. In 1969, forest land accounted for 1.2 million acres or two-thirds of the unprotected area. In 1950, forest land totaled 1.4 million acres and occupied three-fourths of the unprotected area. Most of the 0.2 million acres cleared since 1950 are now in crop use but small acreages have shifted to grassland, farm roads, and the like.

Cropland inside levees totaled 431,000 acres in 1969 or almost double the 1950 acreage of 237,000. These figures respectively represent about one-fourth and one-eighth of the unprotected area and, as noted above, closely reflect the contemporary decrease in forest land. Thus, land clearing for crop use has been occurring rapidly in recent years despite existing flood hazards. Yet, cropland still has not attained the dominant use position in unprotected areas that it holds in the study area as a whole.

TABLE 5.—MAJOR LAND USES INSIDE LEVEES,[1] 1950 AND 1969

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage					
		Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	431	231	10	1	189		
Grassland	61	4	37	1	19		
Transition	15	1	3	8	3		
Forest	1,194	1	1		1,192		
Urban	5				1	4	
Other	112				3		109
Total	1,818	237	51	10	1,407	4	109

[1] Includes approximately 1,500,000 acres between levees and river and 3,000,000 acres between bluffs and river.

DISTRIBUTION OF CROPLAND AND FOREST

Cropland and forest land collectively account for more than 80 percent of the area of each State component, about the same as for the region as a whole. Individually, however, the two uses are distributed unevenly among States (table 6). In 1969, cropland as a

TABLE 6.—CROPLAND AND FOREST ACREAGES AS PERCENTAGE OF TOTAL LAND AREA BY STATE, SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, 1950 AND 1969

State	Total area acres (thousands)	Cropland (percent)		Forest (percent)		Other uses (percent)	
		1969	1950	1969	1950	1969	1950
Arkansas	8, 888	63	45	25	45	12	10
Louisiana	7, 276	35	22	50	66	15	12
Mississippi	4, 892	64	48	25	41	11	11
Missouri	2, 492	84	72	7	20	9	8
Tennessee	451	57	36	35	57	8	7
Kentucky	80	52	35	40	59	8	6
Total	24, 079	57	41	31	48	12	11

percentage of total land area ranged from 35 percent in the Louisiana component to 84 percent in Missouri. Forest land, occurring inversely with cropland, ranged from a high of 50 percent in Louisiana to only 7 percent in Missouri. A similar pattern existed in 1950, although the proportion of area in each use differed significantly from that in 1969. In 1950, cropland as a percentage of total area ranged from 22 percent in the Louisiana component to 72 percent in Missouri; forest land ranged from 66 percent to 20 percent in the same components respectively. Table 6 also indicates the distribution of land clearing and cropland development among States during the 1950–69 period. In Arkansas, for example, cropland occupied an additional 18 percent of the land area (increasing from 45 to 63 percent), while forest was removed from 20 percent of the area (decreasing from 45 to 25 percent).

Cropland

The variable distribution of cropland among and within States is shown graphically in figure 3. Cropland development has reached its highest level in several southeastern Missouri counties and in adjacent Mississippi County, Ark. (see fig. 1 for county and parish names), where 80 percent or more of the land is used for crops. Cropland occurs at frequencies of 60 to 80 percent in another broad area extending from Missouri through much of the Arkansas and Mississippi components to the northeast corner of Louisiana. Cropland acreages are relatively low in southern Lousiana and in several counties of Arkansas. In general, cropland as a percentage of total land area decreases from north to south in the study area.

Land cleared for crop use

The net increase in cropland between 1950 and 1969 as a percentage of county land area is shown in figure 4. Since new cropland and land cleared are almost equivalent, figure 4 also reflects the distribution and rates of land clearing during the period. Land was cleared for crop use at particularly rapid rates (30 percent or more of the land area) along the western margin of the study area in Missouri and Arkansas, in the vicinity of the Louisiana-Arkansas border, and in scattered counties elsewhere. About 20 to 30 percent of the land area was added to the cropland base in several other counties and parishes. These counties generally are adjacent to those experiencing very intensive clearing activity or are found along the eastern margin of the study area in Mississippi.

FIGURE 3.—Cropland, 1969 Southern Mississippi Alluvial Valley (Proportion of Total Land Area)

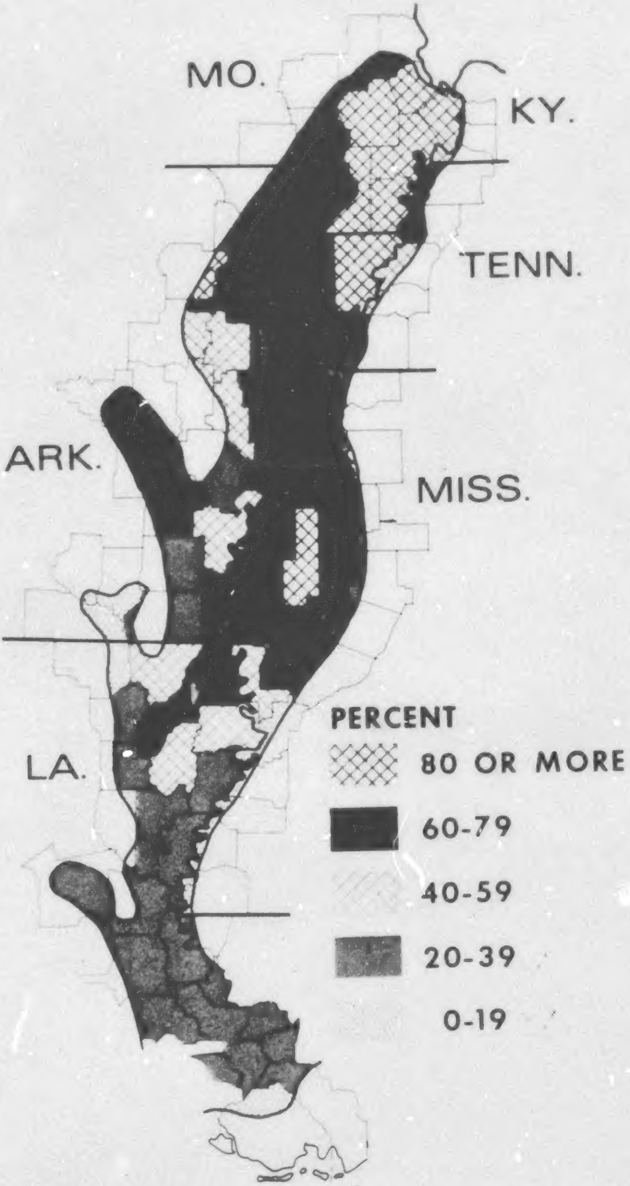
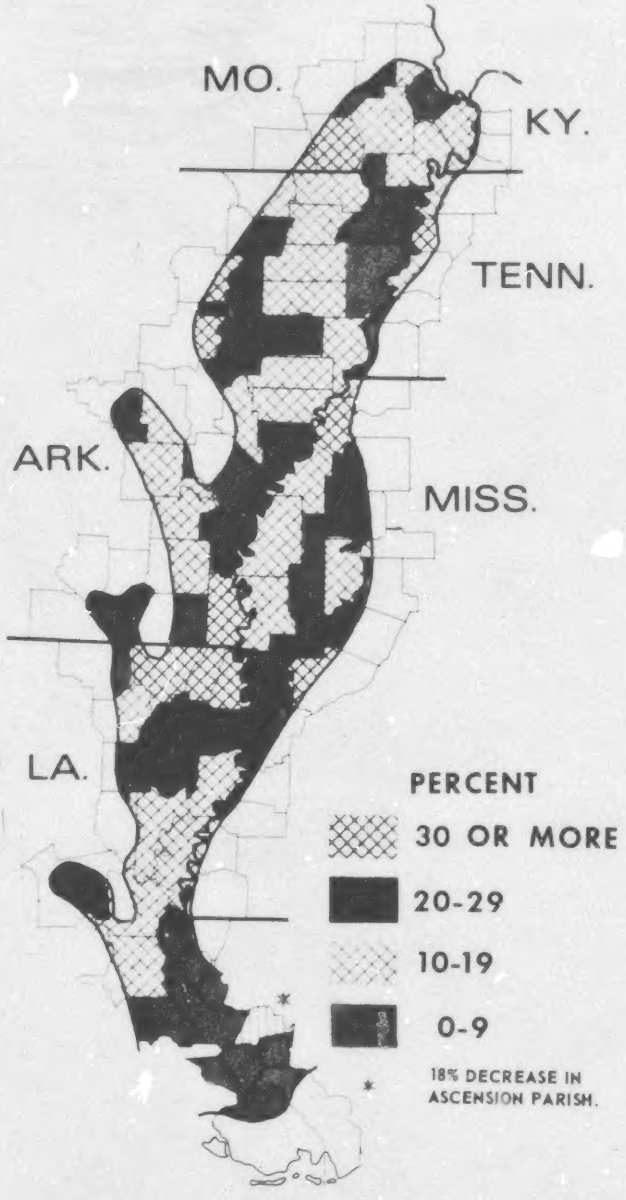


FIGURE 4. – Increase on cropland, 1950-69 Southern Mississippi Alluvial Valley (Proportion of Total Land Area)



Counties experiencing little gain in cropland are in two categories; those that were already highly developed agriculturally when the study period began, and those that still are predominately forested. These relationships can be seen by comparing figures 3, 4, and 5. For example, a high proportion of the area in southeastern Missouri is cropland (fig. 3), but little of this acreage was cleared after 1950 (fig. 4). Similarly, Sunflower County, Miss., and Mississippi County, Ark., became highly cleared in advance of adjacent counties. In contrast, parishes in the southern portion of the study area have experienced relatively little land clearing although relatively heavily forested (fig. 5).

Forest

The distribution of forest land within the study area also is shown in figure 5. Forest now occupies less than 20 percent of the area of most counties in the Missouri component and many counties in the Arkansas and Mississippi components. Several counties in Arkansas and Mississippi are 20 to 40 percent forested, but higher proportions are rare in these components. In contrast, the majority of Louisiana parishes in the study area are 40 to 60 percent or more forested for an overall average, noted earlier, of 50 percent. Only one parish (West Carroll), where clearing activities since 1950 have been particularly intense, is less than 20 percent forested.

POTENTIAL LAND CLEARING

Beyond noting that land-clearing activities were widespread in 1969, no attempt was made to evaluate the potential for further cropland development in the Southern Mississippi Valley from photographic imagery. This potential as of 1967 can be assessed with data from the National Inventory of Soil and Water Conservation Needs (CNI). The CNI classified soils by degree of soil limitation for growing field crops and the dominant kind of limitation or hazard. In the Southern Mississippi Alluvial Valley, where damaging overflow and poor drainage are the dominant hazards, the applicable capability classes are II W and III W. This symbolization represents most of the land in the region with correctable or manageable problems. Thus, the acreage of forest land in classes II W and III W can be approximately equated with the acreage potentially usable for crops.

Acreages of classes II W and III W forest land, as reported by the CNI for the six State components, are shown in table 7. To be useful as an indicator of potential cropland in the region, it must be assumed that most of the class II W and III W forest land, which was reported by county, actually occurs in the alluvial portion of the counties involved. An examination of the physical characteristics of adjacent areas indicated that approximately 0.4 million of the 5.6 million-acre total may be located outside the study area. With this adjustment, the CNI data indicate that the potential acreage of new cropland in the Southern Mississippi Alluvial Valley was 5.2 million acres in 1967.

FIGURE 5.—Forest land, 1969 Southern Mississippi Alluvial Valley (Proportion of Total Land Area)

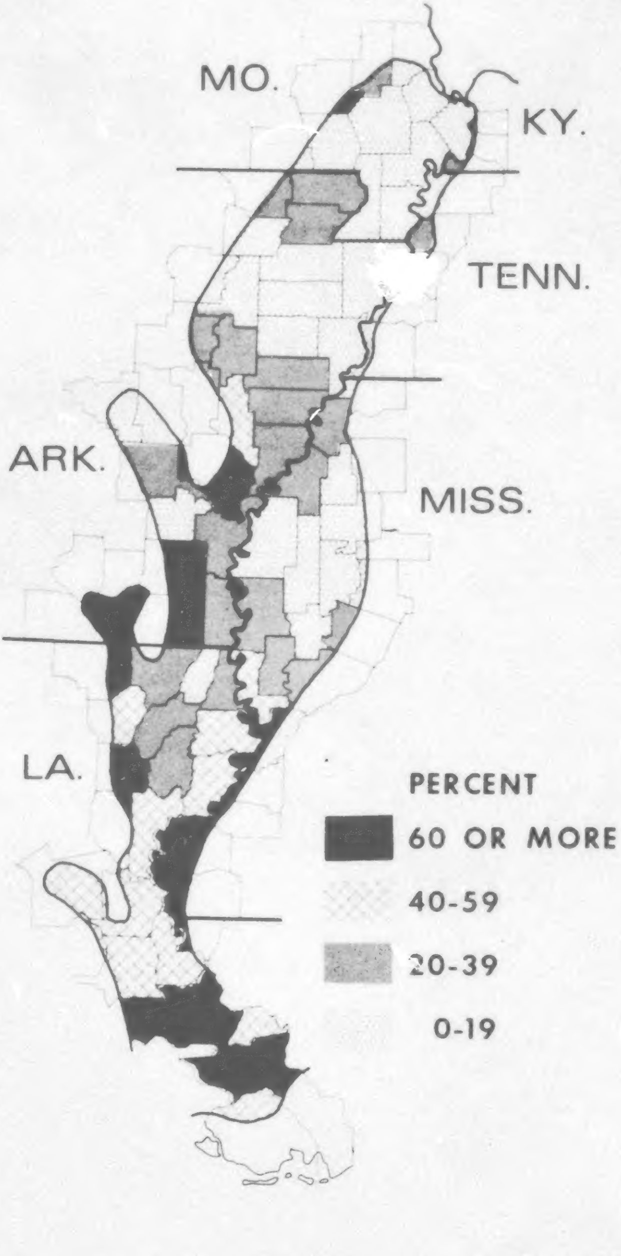


TABLE 7.—FOREST LAND, CAPABILITY SUBCLASSES II-W AND III-W, SOUTHERN MISSISSIPPI ALLUVIAL VALLEY[1]

State component	Forest land—subclasses II-W and III-W: Acreage (thousands)	Forest land—subclasses II-W and III-W: Percentage
Arkansas	2, 069	37
Louisiana	2, 496	44
Mississippi	647	11
Missouri	145	3
Tennessee	220	4
Kentucky	45	1
Total	5, 622	100

[1] From the 1967 national inventory of soil and water conservation needs. Data are for complete counties and, thus, may include some acreage outside the alluvial valley.

TABLE 8.—MAJOR USES OF LAND IN THE SOUTHERN MISSISSIPPI ALLUVIAL VALLEY, BY STATE. 1969

[In thousands of acres]

State	Cropland	Grassland	Transition	Forest	Urban	Other	Total
Arkansas	5, 608	440	38	2, 251	105	446	8, 888
Louisiana	2 566	432	97	3, 602	225	354	7, 276
Mississippi	3, 145	182	15	1, 238	74	238	4, 892
Missouri	2, 093	30	3	177	39	150	2, 492
Tennessee	256	9	3	157	4	22	451
Kentucky	42	1	1	32		4	80
Total	13, 710	1, 094	157	7, 457	447	1, 214	24, 079

TABLE 9.—MAJOR USES OF LAND IN THE SOUTHERN MISSIPPIPPI ALLUVIAL VALLEY, BY STATE, 1950

[In thousands of acres]

State	Cropland	Grassland	Transition	Forest	Urban	Other	Total
Arkansas	4, 040	343	56	3, 967	85	397	8, 888
Louisiana	1, 626	329	44	4, 762	174	341	7, 276
Mississippi	2, 326	256	22	1, 983	66	239	4, 892
Missouri	1, 781	22	6	503	36	144	2, 492
Tennessee	162	8	1	258	4	18	451
Kentucky	28			47		5	80
Total	9, 963	958	129	11, 520	365	1, 144	24, 079

TABLE 10.—SPECIFIC SHIFTS IN LAND USE, ARKANSAS COMPONENT, 1950–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1959 acreage: Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	5, 608	3, 930	63	23	1, 590		2
Grassland	440	72	260	6	102		
Transition	39	9	10	12	8		
Forest	2, 251	7	5	15	2, 224		1
Urban	104	14	4	1	2	83	
Other	447	8	1		41	1	396
Total	8, 809	4, 040	343	57	3, 967	84	399

TABLE 11.—SPECIFIC SHIFTS IN LAND USE, LOUISIANA COMPONENT, 1950–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage: Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	2,566	1,438	46	20	1,060		1
Grassland	432	76	263	4	88		1
Transition	97	79	2	9	7		
Forest	3,602	5	13	10	3 564	10	
Urban	225	24	4	1	33	163	
Other	354	4		1	10		339
Total	7,276	1,626	328	45	4,763	173	341

TABLE 12.—SPECIFIC SHIFTS IN LAND USE, MISSISSIPPI COMPONENT, 1950–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage: Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	3,145	2,283	107	14	736	1	4
Grassland	182	27	139	2	14		
Transition	15	4	7	4			
Forest	1,238	4	1	2	1,231		
Urban	74	6	1		1	66	
Other	238	1	1		1		235
Total	4,892	2,325	256	22	1,983	67	239

TABLE 13.—SPECIFIC SHIFTS IN LAND USE, MISSOURI COMPONENT, 1960–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage: Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	2,093	1,760	3	5	322		3
Grassland	30	11	17		2		
Transition	3		2		1		
Forest	177	4		1	171		1
Urban	39	2			1	36	
Other	150	4			6		140
Total	2,492	1,781	22	6	503	36	144

TABLE 14.—SPECIFIC SHIFTS IN LAND USE, TENNESSEE AND KENTUCKY COMPONENTS, 1950–69

[In thousands of acres]

Major land use	1969	Use in 1950 of 1969 acreage: Cropland	Grassland	Transition	Forest	Urban	Other
Cropland	298	189	1		108		
Grassland	10		7		3		
Transition	4	1		1	2		
Forest	189				189		
Urban	4					4	
Other	26				4		22
Total	531	190	8	1	306	4	22

URBANIZATION OF LAND IN THE NORTHEASTERN UNITED STATES

[By Henry W. Dill, Jr., and Robert C. Otte[1]]

STUDY OBJECTIVES

The study reported on here was undertaken as part of a continuing inter-agency investigation of the potential for water development in the North Atlantic Water Resources Region.[2] The intent of the study was to develop information on the quantity, quality, and prior use of land—particularly agricultural land—that had shifted to urban uses.

Specifically, the objectives were:

1. To identify and measure land converted to urban uses in the most recent period practicable.
2. To determine the prior use of land urbanized.
3. To determine the land use capability class (quality) of land urbanized.
4. To relate quantities of land urbanized to population increases.

THE STUDY AREA

The North Atlantic Water Resources Region covers an area of about 106 million acres, and in 1960 was home to some 45 million people—25 percent of the Nation's total population. For the study, 96 counties in 12 of these States were selected for intensive analysis (fig. 1).

TYPE AND AMOUNT OF URBANIZATION

Land was urbanized for the 96-county area at an estimated average rate of about 12,000 acres per year during 1950–60. Over 85 percent of the observed shift was to residential use. About 5 percent went to industrial uses, with smaller percentages going to recreational, institutional, commercial, and airport uses (table 1)

Residential development was overwhelmingly (about 78 percent) composed of single-family dwellings on large lots, with blocks of development averaging no more than two houses per acre. The more urban SMSA counties had smaller percentages going to residential use. Some of the cities in non-SMSA counties served predominantly agricultural areas. Also, these counties included some "bedroom" communities and areas where urban development was just beginning. These communities and areas generally had proportionately less land in industrial, commercial, and intensive recreational uses, and

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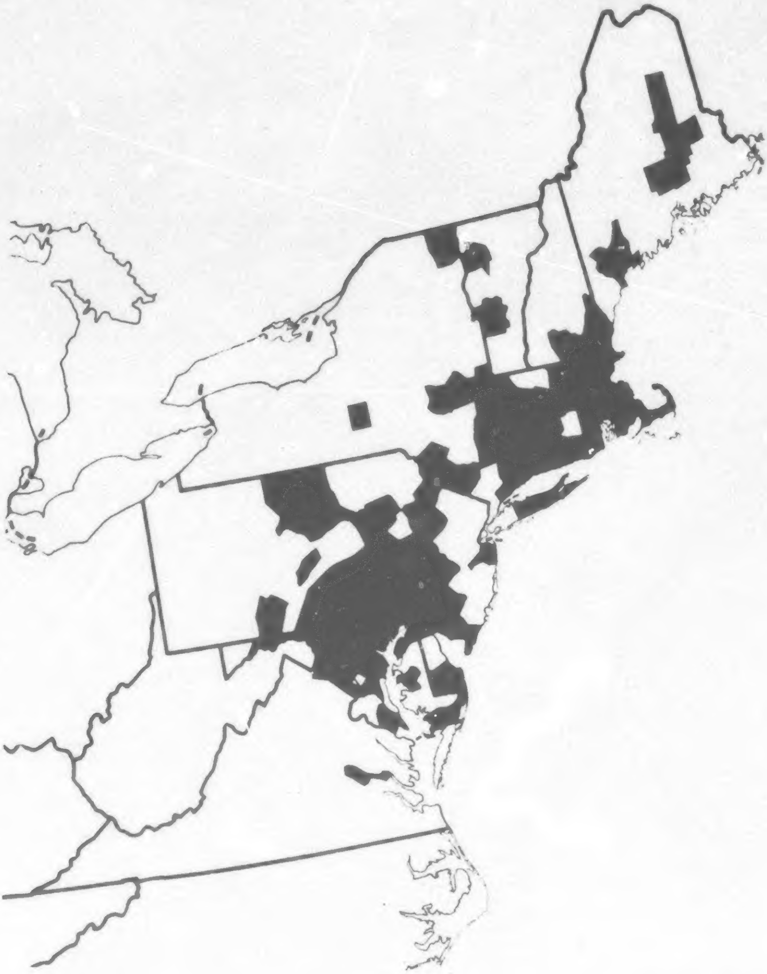
[1] Natural Resources Economics Division, Economic Research Service, U.S. Department of Agriculture

[2] The region comprises 271 countries and 25 independent cities in Delaware, New Jersey, Connecticut, Rhode Island, Massachusetts, Maine, Vermont, and New Hampshire, the District of Columbia, and parts of Virginia, West Virginia, Maryland, Pennsylvania, and New York.

FIGURE 1.—96 Study Counties, North Atlantic Water Resources Region



land was used more liberally for residential construction. For each residential acre, about .14 acre was developed for other urban uses in the SMSA counties and .10 acre in the non-SMSA counties.

PRIOR USE OF LAND

About one-half the land urbanized was used for crops prior to development. Table 2 compares the proportions of the prior uses of

TABLE 1.—SMSA STATUS OF LAND URBANIZED, BY TYPE OF USE, 96 NORTHEASTERN COUNTIES, 1950-60 [1]

[In percent]

Urban use	All counties	SMSA counties	Non-SMSA counties
Open residential	77.6		
Dense residential	8.3	[2] 84.8	[2] 90.8
Industrial	5.5		
Other urban	8.6	[3] 15.2	[3] 9.2
Total	100.0	100.0	100.0

[1] Standard metropolitan statistical areas. An SMSA is a county or group of counties defined by the Census Bureau as an entire area in or around a city or community of at least 50,000 people in which activities form an integrated economic and social system.

[2] Open and dense residential and industrial uses combined.

[3] Industrial and other urban uses combined.

TABLE 2.—PRIOR USE OF LAND URBANIZED AND 1958 USE OF RURAL LAND IN STUDY AREA, 96 NORTHEASTERN COUNTIES, 1950-60

[In percent]

Type of use	Prior use of land urbanized	Use of rural land in study area, 1958 [1]
Crop	49.1	23.7
Forest	25.5	59.7
Grass	3.1	8.6
Idle (other) [2]	22.3	8.0
Total land	100.0	100.0

[1] Nonurban, non-Federal land—1958 national inventory of soil and water conservation needs (CNI).

[2] "Other" area figure taken from CNI includes all uses other than for crops, forest, and grass.

land taken for urbanization with the proportion of these uses in the total rural area of the counties studied. While in the total rural area of the counties studied, only 23.7 percent was cropland in 1958, almost 50 percent of the land urbanized had been cropland. For most urban uses, land is preferred that is well-drained and reasonably level. These are also qualities of good cropland. Additionally, terrain too rugged for agricultural use is often impractical or expensive to develop for urban uses. Industrial and commercial uses particularly need easy access to rail or highway transportation, which is more likely to be available on the more level land.

About 60 percent of the total rural area studied was in forest in 1958. Only about 25 percent of the land urbanized had been forested prior to development. Again, much of the forest was on rough terrain not easily developed for urban uses.

About 22 percent of the land urbanized during 1950–60 was idle and nonforested prior to conversion. Only 8 percent of the total rural land of the study counties was in this category in 1958. In the Northeast, agricultural production apparently ceases on much land some years before the land is actually converted to urban uses. This was noted in particular for many dairy farms. When a dairy farm is sold, all agricultural operations cease. In contrast, in some cash crop situations, individual fields tend to stay in production almost to the day the bulldozer arrives to begin construction for a new urban use.

QUALITY OF LAND URBANIZED

Because the 1958 CNI was used for the study, it was possible to compile data on the agricultural quality of the land urbanized. The better agricultural land was apparently bought for urban uses. Although slightly less than 42 percent of the rural land in the study area is in land use capability classes I, II, and III, over 80 percent of the land converted to urban uses during 1950–60 was in these classes (table 3). The terrain ranges from level to gently rolling, and the land has good internal and surface drainage.

TABLE 3.—LAND URBANIZED AND ALL RURAL LAND, BY LAND USE CAPABILITY CLASS, 96 NORTHEASTERN COUNTIES, 1950–60

[In percent]

Land use capability class	Land urbanized	Total rural area[1]
I	3.7	2.5
II	50.7	20.5
III	26.5	18.5
Subtotal, land in I–III	80.9	41.5
IV–VIII	19.1	58.5
Total land in I–VIII	100.0	100.0

[1] Total area of study counties exclusive of urban and federally owned land (1958 CNI).

Because of the process of land use planning, combined with modern building and sanitary regulations in many local governmental jurisdictions, attention is undoubtedly directed to development of land in classes I–III. Land in classes IV–VIII is more apt to have problems of drainage, soil slippage, and unstable subsoils than is land in classes I–III. The better agricultural land is generally more suitable for septic fields. Also, road construction and utility installation are more expensive on the steeper lands—per mile, roads are more expensive and fewer houses are served.

However, in the northern half of the North Atlantic Water Resources Region, some exceptions were observed in the use of land in classes VI and VII for urban development. These two classes include soils that developed on sands and gravels from glacial outwash and are too subject to drought for agricultural use. But when land in these classes is level, it has been used for industrial sites, airports, and some dense residential development.

An additional point about selection of land for urban development is that the developer may be interested only in the better land (classes I and II). However, most of the transfer of land to urban use is by farm ownership unit, and these units often contain land in several classes. Thus, poorer land may be withdrawn from agricultural use even if it is not actually used for development.

LAND USED FOR HIGHWAYS

Construction of the new interstate highway system began during the last years of the study period; thus, some land used for highways was observed on the sample plots. The low incidence of observed highway construction precluded statistically significant quantification. Highway routes were apparently not selective of level land. Highways were built on land with nearly all terrain and soil conditions existing in the study area.

RELATIONSHIP OF LAND URBANIZATION TO POPULATION INCREASES

The amount of land urbanized per capita population increase depends on many factors. The type of terrain affects the proportion of land area that can be utilized. Zoning laws and subdivision regulations influence lot sizes. Affluence permits people the luxury of more space around their houses. Some areas have a higher proportion of their populations living in apartments and rowhouses.

Commercial, industrial, institutional, and recreational uses of land may not be as directly related to the population within a given county as are residential uses, but one would expect a fairly close relationship in the aggregate. Business and industry both follow and are followed by customers and labor. The types of recreational use identified in the study—golf courses, drive-in movies, playgrounds, and others—are oriented to resident population. Some institutional uses, such as colleges and mental institutions, may have a State or regional orientation. However, for multicounty areas, these factors tend to average out.

Amounts of urbanized land identified by airphoto interpretation represent a minimum measure of urban impact. Only that area with visible change was counted. Land dedicated to extensively used parks or open spaces was not included. Nor was land that is indirectly affected; for example, agricultural land on which production has been curtailed to accommodate urban neighbors.

For all 96 counties, about .22 acre was converted from rural use to residential, institutional, commercial, industrial, recreational, and airport uses for each person added to the population of these counties. SMSA counties showed .20 acre converted per capita population increase. Non-SMSA counties had a rate twice as high—.40 acre per capita. Generally, these less urban counties had fewer high-density developments; in many cases, single houses were on large lots.

URBANIZATION OF LAND IN THE WESTERN STATES

[By Henry W. Dill, Jr., and Robert C. Otte, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture]

INTRODUCTION

Additional information has been needed on amount and kinds of rural land shifting to urban uses. Such information can be useful in interagency surveys of potential water development in the Columbia-North Pacific, California, and Colorado Water Resource Regions as a basis for projecting quantities and locations of land required for urban development.[1]

DEVELOPMENT OF THE BASIC DATA

Data are not regularly compiled on acreages of land in urban use. Although general estimates have been made by measuring areas designated as urban by the decennial census of population, this procedure provides statistics only on a State basis.[2] The most feasible way of gathering specific data appeared to be interpretation of airphotos to determine the amount of land that had changed to urban and associated uses between the population census years 1950 and 1960. These data could then be related to projected population increases to estimate land required for urban development.

Specifically, the objectives of the study were:

1. To measure acreage of land converted to urban uses in the most recent period practicable.
2. To determine prior use of land urbanized.
3. To relate quantities of land urbanized to population increases.

The Economic Research Service has over the past 15 years employed analysis of airphotos for successive time periods to measure changes in land use.[3] In this procedure, index sheets from airphotos in the scale of 1:63,360 (1 inch to the mile), taken at two different times, are compared to detect changes in land use. These sheets have been prepared for all areas photographed for the Agricultural Stabilization and Conservation Service (ASCS) of the U.S. Department of Agriculture. Although airphoto index sheets are uncontrolled mosaics with some error, they do permit rapid study of a large area.

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[1] These regions are comprised of the States of Washington, Oregon, California, and Arizona, and parts of Idaho, Montana, Colorado, New Mexico, Utah, and Wyoming.

[2] Frey, H. Thomas, Krause, Orville E., and Dickason, Clifford. Major Uses of Land and Water in the United States with Special Reference to Agriculture: Summary for 1964. Agr. Econ. Report No. 149. Nov. 1968, pp. 67–68.

[3] Dill, Henry W., Jr. "Use of the Comparison Method in Agricultural Airphoto Interpretation." Photogrammetric Engineering. Vol. 25, No. 1, Mar. 1959.

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SELECTION OF COUNTIES

A preliminary study was made of the entire survey area, using airphoto index sheets from the national file of ASCS. A preliminary analysis was made of photo index sheets of counties showing urban impact. Although nearly all the counties checked in the preliminary study had some small shift of farmland to urban use—often string development along roads or in areas adjacent to villages—the study was narrowed to 48 counties showing average shifts of more than 50 acres per year.[4] Three counties were not included because of inadequate photo coverage: Marin, Calif.; Tacoma, Wash.; and Clark (Las Vegas), Nev. Shift of farmland to urban use in San Bernardino, Calif., was measured but eliminated from further analyses because it was judged to be atypical. A number of developments had been laid out but only partially built upon.

LAND USE CATEGORIES

The next step in the study was to determine the categories of change that could be identified and measured from analysis of airphotos. Four categories of rural land use and seven categories of urban use could be identified using airphoto index sheets with two-power magnification.

Rural land use

Cropland—row crops, close grown crops, hay, orchards.
Grassland—managed pasture, rangeland.
Idle land—unused cropland and pasture.[5]
Forest—areas substantially covered by trees.

Urban land use

Dense residential—houses on small lots, apartments, row houses.
Open residential—one house or less per acre.
Institutional—schools, hospitals, government buildings.
Commercial—mainly shopping centers.
Industrial—factories, storage yards, auto graveyards, gravel pits.
Recreational—parks, golf course, drive-in theaters, race tracks.
Airports.

The urban use categories were selected to provide the most detailed classification possible using the small-scale airphotos. The classes most subject to error in identification are institutional, commercial, and industrial. While these uses could have been combined into a nonresidential category, they were treated separately to provide an estimate of land requirements for each use.

In addition, two patterns or types of distribution of urbanization were identified and measured: Suburban or "contiguous" development around a city or town and isolated, unattached "noncontiguous" developments ranging from small groups to larger aggregations of houses.

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[4] See table 2 for list of counties.

[5] Includes cropland, some pasture not in production prior to shifting to urban use, and land in farms purchased for speculation and taken out of production pending development.

PHOTO INTERPRETATION

The counties with significant shifts of farmland were next studied in detail, using airphoto index sheets. The analysis was basically a systematic comparison of a given area for two periods to identify change. To facilitate use of the index sheets, which are generally 20 by 24 inches in size, the early coverage sheets were folded in 4-inch folds for closer inspection of any given item. Shifts of farmland to urban use were outlined on the more recent airphotos with a china marking pencil, and the previous land use (cropland, idle, grassland, and forest) indicated by symbol. Areas so defined were measured by using a transparent dot grid with 100 dots per square inch. Each dot is equivalent to 6.4 acres, providing a measurement accuracy of ±3.2 acres per square mile.

In general, data obtained from the study include the major shifts of farmland to urban and associated uses. In most of the areas, there is some scattered residential development along roads. This string type of development is difficult to measure on the scale of the photographs used, and measurements were not made. However, in some areas there are substantial amounts of such development which could accommodate some increase in population.

An additional factor affecting accuracy was the use of uncontrolled airphoto mosaics with varying amounts of distortion. More precise area measurement could have been obtained with use of contact prints. However, error due to this lack of precision appears to be random. Any increase in accuracy from use of contact prints probably would not justify the additional time and expense required.

TYPE AND AMOUNT OF URBANIZATION

In the 48 counties studied, about 465,000 acres were found to have shifted to urban uses in an average span of 11+ years (table 1). The greatest amount of urbanization, of course, occurred in the metropolitan complexes of Southern California, the San Francisco Bay area, Seattle, and Portland, plus the Phoenix area. A substantial shift of acreage took place in smaller, more isolated centers such as Fresno, Calif., and Spokane, Wash. Lesser amounts of urbanization occurred in a number of counties with smaller cities.

TABLE 1.—TOTAL LAND USE SHIFTS IN STUDY COUNTIES [1] [2]

[In acres]

	New urban use							
Prior rural use	Dense residential	Open residential	Industrial	Institutional	Commercial	Recreation	Airport	Total
Cropland	269,365	31,545	19,875	15,025	15,270	8,335	2,565	361,980
Grassland	43,170	24,200	4,715	2,075	875	1,745	790	77,570
Forest	11,830	5,160	465			135		17,590
Idle cropland	4,480	1,210	1,135	60	90	555	210	7,740
Total	328,845	62,115	26,190	17,160	16,235	10,770	3,565	464,880

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

[2] Figures rounded to nearest multiple of 5.

Some differences were noted in the patterns of urbanization and the intensity of use between counties in urban complexes and those around smaller cities. To better explore these differences, the 48 counties were classified according to their relationship to Standard Metropolitan Statistical Areas (SMSA's). An SMSA is a county or group of counties defined by the Census Bureau as an entire area in and around a city or community of at least 50,000 in which the activties form an integrated economic and social system. The study counties were classified as (1) being within a multiple-county SMSA, (2) constituting a single-county SMSA, or (3) falling outside any SMSA. Thirteen counties fell in the first group, 11 counties in the second, and 24 in the third (table 2).

Overall, 84 percent of the land urbanized went to residential use. This proportion was fairly consistent for all three classes of counties. However, more of the residential use was of the dense residential type (houses on small lots, row houses, and apartments) for the more highly urbanized areas—80 percent, 67 percent, and 55 percent (of total urban use) for the multiple-county SMSA's, single-county SMSA's, and non-SMSA counties, respectively (table 3). Overall, for each acre going to residential use, about 0.15 acre was developed for commercial, industrial, institutional, recreational, and airport use.

Also, contiguity of urbanization—whether it is generally aggregated or in scattered developments—appears to be related to SMSA status.

TABLE 2.—SMSA STATUS OF STUDY COUNTIES, BY STATE

State	Counties in multicounty SMSA's	Single-county SMSA's	Non-SMSA counties
Arizona		Maricopa, Pima	Yuma.
California	Alameda, Contra Costa, Los Angeles, Orange, Riverside, San Mateo, and Solano.	Fresno, Kern, Sacramento, San Diego, San Joaquin, Santa Barbara, and Santa Clara.	Imperial, Merced, Monterey, Santa Cruz, Sonoma, Stanislaus, Sutter, Tulare, Ventura, Yolo, and Yuba.
Colorado			La Plata, Mesa, Montezuma, and Montrose.
Idaho			Ada, Bannock, and Bonneville.
Montana			Missoula.
New Mexico			San Juan.
Oregon	Clackamas, Multnomah, and Washington.	Lane	Linn, Marion.
Washington	Clark, King, and Snohomish	Spokane	Yakima.

TABLE 3.—SMSA STATUS OF LAND URBANIZED BY TYPE OF URBAN USE [1]

[In percent]

Type of urban use	SMSA status			
	Multicounty SMSA	Single-county SMSA	Non-SMSA	All counties
Dense residential	80.0	67.0	54.7	71.0
Open residential	6.0	16.7	25.0	13.1
Industrial	5.3	5.7	7.6	5.8
Institutional	3.4	3.7	4.8	3.7
Commercial	3.5	3.5	2.1	3.3
Recreation	1.3	2.4	5.1	2.3
Airport	.5	1.0	.7	.8
Total	100.0	100.0	100.0	100.0

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

In the counties found within multiple-county SMSA's, 92 percent of the urbanization was classed as contiguous, while in the non-SMSA counties only 67 percent was so classified (table 4).

PRIOR USE OF LAND

Overall, a high proportion—about three-fourths—of land urbanized was previously devoted to crop production, usually of high-valued, irrigated crops (table 5). In some California counties, all of the land came from cropland. Los Angeles, Orange, Riverside, and Santa Clara Counties used over 90 percent cropland in their expansion—averaging some 14,000 acres annually over the period covered for the four counties. Phoenix (Maricopa County) used almost 80 percent cropland (an average of over 3,000 acres per year). Conversely, in the Seattle area only about 10 percent of land urbanized was formerly cropland. Seattle and Portland were the only areas where significant quantities of forest land were converted to urban use. Most counties showed urbanization of some grassland, the quality varying from productive pasture to near-desert. In only a few counties, such as San Diego and San Mateo, Calif., and Pima, Ariz., did the proportion of grassland urbanized exceed 50 percent.

Only slightly over 2 percent of the land was idle prior to urbanization. Apparently, the highly productive irrigated cropland in the study counties is kept in production until actually converted to the new urban use.

TABLE 4.—SMSA STATUS OF LAND URBANIZED BY CONTIGUOUS OR NONCONTIGUOUS DEVELOPMENT PATTERN[1]

[In percent]

Development pattern	SMSA status			
	Multicounty SMSA	Single-county SMSA	Non-SMSA	All counties
Contiguous	92.0	79.9	67.2	83.0
Noncontiguous	8.0	20.1	32.8	17.0
Total	100.0	100.0	100.0	100.

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

TABLE 5.—SMSA STATUS OF LAND URBANIZED BY PRIOR LAND USE[1]

[In percent]

Prior land use	SMSA status			
	Multicounty SMSA	Single-county SMSA	Non-SMSA	All counties
Cropland	79.5	79.2	76.1	76.4
Grassland	10.3	24.5	21.3	17.6
Forest	7.3	1.2	1.2	3.9
Idle	2.9	1.4	1.4	2.1
Total	100.0	100.0	100.0	100.0

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

RELATIONSHIP OF LAND URBANIZATION TO POPULATION INCREASE

In exploring relationships between population increases and urbanization of land, photos were selected to encompass as nearly as possible the same years as the two most recent censuses of population, 1950 and 1960. Coverage was available from ASCS for most of the counties for 1948–54 and 1956–66. Commercial airphoto coverage was obtained for a few areas where ASCS coverage was not available. In no county were photos available for the precise years 1950 and 1960. Typically, the photos bracketed more years than the censuses.

One method for measuring the degree of coincidence between the photo years and census years is to consider the total number of years spanned by either photos or censuses. For example, with photos for 1948 and 1959, a total of 12 years is involved, of which 9 were covered by either the 1950 or 1960 censuses and by photos. This could be called a 75-percent coincidence.

Using this measure, there was an overall 59-percent coincidence for the 49 counties. Of 647 total years involved, 379 were covered by both photo and census data, 167 were years with photo but not census coverage, and 101 were years with census but not photo coverage. Coincidence ranged from 29 to 91 percent, with over three-quarters of the counties showing a coincidence of over 50 percent.

As an area becomes more populous and takes on metropolitan characteristics, land is used more intensively and less additional surface area is taken for work, living, and service functions for each new person added to the population. Between 1950 and 1960, almost 60 percent of the population increase in the study counties occurred within multicounty SMSA's, while these same counties accounted for only about 40 percent of the land urbanized (table 6). Within the multicounty SMSA's, about .05 acre of land was urbanized per capita increase in population. Over twice as much per capita population increase, almost .13 acre, was urbanized in the non-SMSA counties (table 7).

VARIATIONS AMONG COUNTIES IN URBANIZATION RATES

Individual counties showed substantial variation in land urbanized per capita population increase. Within the multicounty SMSA's, rates varied from .03 acre per person in Los Angeles County to .23 and

TABLE 6.—AVERAGE ANNUAL LAND URBANIZATION DURING STUDY PERIOD AND POPULATION INCREASE, 1950–60 BY SMSA STATUS OF LAND [1]

SMSA status	Counties (number)	Average annual conversion of land to all urban uses: Amount (acres)	Average annual conversion of land to all urban uses: As a percentage of total	Average annual population increase, 1950–60: Number	Average annual population increase, 1950–60: As a percentage of total
Multicounty	13	17, 550	41. 1	340, 665	58. 9
Single county	11	18, 775	43. 9	187, 675	32. 4
Non-SMSA	24	6, 410	15. 0	50, 090	8. 7
All counties	48	42, 735	100. 0	578, 430	100. 0

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

TABLE 7.—LAND URBANIZED PER CAPITA POPULATION INCREASE, BY SMSA STATUS OF LAND[1]

SMSA status	Land urbanized per capita for—	
	Residential use (acres)	All urban uses (acres)
Multicounty SMSA's	0.046	0.052
Single county SMSA's	.083	.100
Non-SMSA	.102	.128
All counties	.060	.071

[1] Total unweighted changes in 48 counties. Early coverage of counties ranged from 1941 to 1954. Late coverage ranged from 1958 to 1966. Average span of years was 11 plus.

.25 in Washington and Clark Counties in the Portland SMSA. Single-county SMSA's showed a narrower range—from .05 acre in Pima County (Tucson), Ariz., to .13 acre in San Diego County, Calif. The non-SMSA counties varied from .02 acre in Monterey County, Calif.—the lowest of any county—to .35 acre in Montrose, Colo. There was also the extreme case of San Bernardino County, Calif., in a multicounty SMSA, with .43 acre urbanized per capita population increase.

Many factors affect the amount of land taken for residential use. Zoning laws and subdivision regulations affect lot sizes. Topography and soils may limit development to certain areas. Some counties have a higher proportion of their population living in apartments and row houses. Commercial, industrial, institutional, and recreational use of land is not as likely to be directly related to population within a given county as is residential use. However, in the aggregate one would expect a fairly close relationship. Business and industry either go where clientele and labor are to be found or attract people to the area after they have been established.

The types of recreational use identified in this study—such as golf courses and drive-in-movies—are oriented to resident population. Some institutional uses, such as colleges or mental institutions, may have a State or regional orientation. However, in the aggregate these factors would tend to be offsetting. For example, one county might have a State penitentiary while another hosts a university.

There is some error inherent in using airphoto interpretation to measure urbanization. As an area approaches a saturation point in the urbanizing process, previously unused lots and other small tracts of land are built upon. Houses and garden apartments are sometimes razed and replaced by high-rise apartments. Such changes can add to an areas's capacity to absorb population but may not be identifiable by airphoto interpretation. Also, individual houses built at scattered intervals along rural roads cannot be measured. The houses can be identified, but the amount of land associated with each is nearly impossible to determine from airphotos.

Another source of error is lack of coincidence between census and photo years. Where trends remain fairly constant this probably does not distort the analysis significantly. But if rates of population growth and building increase or decrease within a few years and photo and census years do not coincide, data from the two sources may not be fully compatible.

However, despite fairly wide deviations from the average amount of land urbanized per capita increase in population, simple correlations between land urbanized and population increase were quite high—.89 for both residential use and all urban uses.

IMPROVING WATER QUALITY MANAGEMENT PLANNING IN METROPOLITAN AREAS*

INTRODUCTION

BACKGROUND

In many, if not most, of our Nation's nonmetropolitan areas, water quality has been a relatively recent concern and planning of any type a relatively primitive process. These areas are characterized by many pollution problems common to urban areas—plus additional ones associated with agriculture and rural based industry—and a lack or resources and institutional capabilities to cope with them in compliance with emerging planning requirements.

The Environmental Protection Agency contacted with the National Area Development Institute of Spindletop Research, Inc. to examine water quality management planning in nonmetropolitan areas and recommend improvements reflecting both national policy and the diverse problems of these areas. The direct objective of the study was to assist EPA in adapting its requirements more closely to nonmetropolitan problems and to prescribe appropriate roles for other Federal and State agencies and substate planning and development organizations in the process.

METHOD OF APPROACH

The field survey method was chosen as the best way to provide maximum insights into a complex situation. Three States—Oregon, Wisconsin and South Carolina—were selected, each containing several nonmetropolitan substate districts, and representing different intergovernmental approaches to water quality management planning and a significant amount of program activity by the four Federal agencies involved. They also presented sufficient commonality to provide valid general conclusions.

EPA, the Economic Development Administration, the Department of Housing and Urban Development and the Farmers Home Administration formed an ad hoc interagency committee to help guide the effort. Selected regional, State or area offices of all four agencies were contacted as part of the study, as were their Washington-based officials.

REPORT ORGANIZATION

Following this introductory section, the report contains an executive summary, sections on current water quality management planning activities of Federal, State and regional agencies, the nonmetropolitan organizational setting in which the process occurs, a discussion of conclusions and recommendations.

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*Office of Air and Water Programs, U.S. Environmental Protection Agency.

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LEGISLATIVE REFERENCES

The study's field work, report preparation and publishing arrangements were completed prior to passage of the Federal Water Pollution Control Act Amendments of 1972. Therefore, the references to legislation and related regulations in this report refer to various sections of the Federal Water Pollution Control Act prior to the 1972 amendments.

EXECUTIVE SUMMARY

INTRODUCTION

This report describes the results of a study conducted by the National Area Development Institute for the Environmental Protection Agency on ways to improve water quality management planning for nonmetropolitan areas.

The findings and recommendations set forth in this report are based on a field survey of three states, interviews with officials of EPA, HUD, EDA and FHA, and observations made by the project team in connection with other NADI research and related activity in support of nonmetropolitan area development.

The research focused on the four agencies' programs related to water quality management planning, EPA's planning guidelines, the EPA-HUD Joint Agreement on unified planning requirements and other attempts to devise a coordinated approach. Needs of nonmetropolitan areas to cope with both urban-type pollution problems and nonpoint sources peculiar to the rural setting were analyzed in terms of the capabilities of existing and emerging institutions.

NONMETROPOLITAN WATER QUALITY PLANNING PRACTICES

Water quality management planning, in the dimensions of the truly intergovernmental process envisioned in the EPA Guidelines, is virtually nonexistent in nonmetropolitan America. Interviews with Federal, State and substate district officials revealed the:

Absence of a coordinated intergovernmental approach to planning among Federal agencies with programs related to water quality.

Lack of understanding of the concept of water quality management planning, particularly as it relates to areawide cost effectiveness considerations.

Low level of financial support for water quality management planning in nonmetropolitan areas.

Difficulty in applying the uniform planning requirements of the "EPA-HUD Joint Agreement" in the diverse nonmetropolitan situations.

Almost total reliance of State water quality agencies on regulation and enforcement rather than on a balance in emphasis between regulation, enforcement and management planning to achieve water quality goals.

Conflicts over priorities resulting from basic differences between the primary objectives of areawide planning agencies and those of basin-oriented State agencies.

On the other hand, the survey disclosed some activities which suggest the elements of a workable framework for coordinating water quality management planning in nonmetropolitan areas. The most promising instances were found where:

Regional EPA representatives are working with other Federal and State officials to design and implement a strategy for relating areawide comprehensive and functional planning to the needs of water quality management planning.

State A–95 Clearinghouse agencies strongly support water quality management planning and play an active role in the coordinative process.

Nonmetropolitan areawide planning agencies have developed a coordinated approach to areawide planning by linking comprehensive planning and functional water/sewer planning funded by HUD and FHA with EPA's requirements for water quality management planning.

EPA, HUD, FHA and EDA Regional, State and Area Office officials are attempting to coordinate with one another the planning requirements and project grants of four Federal programs supporting planning and construction water, sewer and waste disposal facilities.

INSTITUTIONAL TRENDS

In addition, it is becoming increasingly clear that:

Planning and development activities being undertaken by nonmetropolitan district organizations will have an important influence on water quality management, and in turn, will be equally influenced by water quality considerations.

Regional offices of Federal agencies are playing an increasingly significant role in grant-in-aid program planning and administration.

The States are assuming increased responsibility in the planning and administration of Federal grant-in-aid programs.

Substate District Planning Agencies, now serving nonmetropolitan areas of some 40 States, are rapidly blanketing the Nation and are being used increasingly by the States for planning and administration of Federal and State Programs and as Regional A–95 Clearinghouses.

Federal reliance on guidelines tends to place more emphasis on procedure rather than performance. When mandatory provisions are unrealistic, the whole approach is discredited.

The survey findings in combination with observations on institutional trends form the basis for concluding that water quality management planning for nonmetropolitan areas can best be accomplished by designing an overall planning strategy to coordinate water quality planning activities systematically with other related areawide planning programs at the substate district level. It was further concluded that:

State designated substate district planning agencies constitute a major resource for the accomplishment of water quality management planning in nonmetropolitan areas.

State designated water quality agencies are in the best position to provide liaison between substate district planning agencies and EPA regional offices with respect to water quality management planning. They are also in the best position to serve as a statewide clearinghouse for water quality oriented technical assistance.

A–95 Clearinghouse agencies at the State and regional levels can play a key role in coordinating water quality management planning with comprehensive and other related planning activities within the state.

EPA Regional Offices are the logical focal point for coordination among HUD, FHA and EDA (Regional, State or Area offices), the States and their substate districts in putting into effect an areawide water quality management planning process in nonmetropolitan areas.

Timetables for the completion of areawide water quality management planning in nonmetropolitan areas would be more effective if scheduled on the basis of a realistic assessment of areawide planning agency capabilities, accomplishments and anticipated progress.

Finally, nonmetropolitan water quality management planning will proceed slowly at best until funds are made available to support the required effort.

These conclusions, when considered in light of the goals and objectives of EPA, reveal the following broadly stated needs which must be met if improved water quality management planning is to be accomplished in nonmetropolitan areas:

Better understanding of the purposes and benefits of water quality management planning on the part of other Federal agencies and the States.

A coordinative approach to water quality management planning throughout the full range of the intergovernmental decision-making process.

A stronger role for nonmetropolitan substate district planning organizations as active participants with State and Federal agencies in the intergovernmental decision-making process.

More flexible planning guidelines for water quality management planning for nonmetropolitan areas.

Increased funding for water quality management planning in nonmetropolitan areas.

RECOMMENDATIONS

The following recommendations represent a significant modification of the current approach to guideline administration and to unifying planning requirements of four Federal agencies. It is based on the conclusion that because of the diverse situations which exist in nonmetropolitan areas, a coordinative planning approach focused at the substate district level would be more effective than an approach which places primary reliance on Federal level interagency agreements on detailed uniform planning requirements.

Coordinative planning on an areawide basis would place water quality considerations in the context of systematic decision-making at the operational level. The nonmetropolitan agencies recommended to play a key role here reflect increasingly the involvement of State governmental authority to which EPA looks for enforcement. The substate district entity thus represents the internal discipline of multifunctional planning relevance and legitimate authority.

Concededly, substate regionalism is at an early stage in its evolution. Funds to support planning are scarce. And much time and manpower will be required to undertake the coordinative process recommended.

The coordinate process offers the opportunity to negotiate the conduct of areawide comprehensive and functional planning so that the fulfillment of one agency's planning requirements meets those of others. The flexibility inherent in tailoring requirements to actual needs should reduce expenditure of resources for irrelevant exercise and generate respect for requirements imposed. And to the extent that substate regionalism represents great potential for genuine program coordination, horizontal and vertical, EPA can both contribute to and benefit from its emergence.

In order for the concept of coordinate planning to be fully operative on behalf of water quality management in nonmetropolitan areas, it is recommended that the Environmental Protection Agency lend all possible support and encouragement to State actions:

1. Requiring Nonmetropolitan Areawide Water Quality Management Plans for all nonmetropolitan areas which are served by a State-designated substate district planning agency.
2. Assigning responsibility for the development of Nonmetropolitan Areawide Water Quality Management Plans to officially designated substate district planning and development agencies unless such action is clearly unwarranted.

To permit the varying levels of detail necessary to reflect the diversity of problems and institutional capabilities in nonmetropolitan areas, it is recommended that EPA–OWP:

3. Establish flexible planning requirements for Nonmetropolitan Areawide Water Quality Management Plans designed to insure realistic consideration of nonmetropolitan areawide water quality problems and maximum utilization of related planning activities.

To reinforce and otherwise support the role of substate districts in areawide water quality management planning for nonmetropolitan areas, it is recommended that EPA:

4. Correlate the deadlines for completion of initial Nonmetropolitan Areawide Water Quality Management Plans with the availability of water quality management planning funds and with implementation schedules established in the water pollution control amendments of 1972.
5. Include planning status and performance assessments in interim criteria for facility grant eligibility pending satisfactory completion of each district's Nonmetropolitan Areawide Water Quality Management Plan.
6. Prepare technical handbooks and other information on nonmetropolitan water quality problems for use by substate planning agencies in developing Nonmetropolitan Areawide Water Quality Management Plans.
7. Establish a nontechnical information and educational program to build understanding of the purposes of, and the need for, cost-effective water quality planning on the part of local officials.

8. Encourage maximum involvement of State A-95 Clearinghouse agencies in all aspects of water quality management planning.

And finally, if water quality management planning is to be accomplished in nonmetropolitan areas quickly enough to affect expenditures in the time frame envisioned in the water pollution control amendments of 1972, it will have to be funded on an accelerated basis.

Therefore, it is strongly recommended that:

9. Every effort be made to stimulate and fund water quality planning grant applications from State-designated substate district planning agencies.

10. Federal and State agencies supporting water quality related planning should be encouraged to increase their technical and financial support for such planning, and to coordinate their implementation timetables and planning requirements whenever possible.

Actions to implement these broadly stated recommendations for improving water quality management planning in nonmetropolitan areas are presented in detail in the last section of the report.

CURRENT WATER QUALITY MANAGEMENT PLANNING PRACTICES

INTRODUCTION

This chapter traces the increasing involvement of the Federal Government in water quality management as reflected in four agencies' programs for facilities and planning. Response to the need for coordination in terms of cost-effectiveness and resolution of interprogram conflicts are analyzed in relation to the HUD-EPA agreement and the unified Guidelines for Water Quality Management Planning. Problems in unifying planning requirements identified in the field survey are discussed and related to the operations of agencies not covered by the interagency agreement.

State approaches to water quality management are reviewed with emphasis on their varying relationship to other environmental concerns and their regulatory focus as opposed to management planning. The advantages and disadvantages of the different institutional roles identified are discussed in relation to the balanced approach implicit in the Guidelines. Also included is a discussion of OMB Circular A-95 as to its relevance to water quality management.

BACKGROUND

Water pollution problems have been of concern to the States, municipalities and the Federal Government for some time. Historically, the approach to these problems has been to set in-stream water quality standards for river basin hydrologic systems and to construct facilities to treat liquid wastes which flow into these systems to achieve established water quality standards.

Traditionally, the costs of constructing and maintaining waste water treatment systems have been the responsibility of State and local governments. However, as it became apparent that their resources were inadequate to cope with the ever-increasing costs of water pollution control, the Federal Government began supporting the construction of municipal waste water collection and treatment facilities. The Federal Water Pollution Control Act of 1964, as amended (P.L. 84-660), made "the prevention, control, and abatement of water pollution" to "enhance the quality and value of . . . water resources" a national goal. With creation of the Environmental Protection Agency in 1970, this goal was made the primary mission of EPA's Office of Water Programs (EPA-OWP).

The major tool available to EPA-OWP is its construction grant program. Section 8(a) of P.L. 660 authorizes grants "for the construction of necessary treatment works to prevent the discharge of untreated or inadequately treated sewage or other waste into any waters and for the purpose of reports, plans, and specifications in connection therewith."

Since the enactment of Section 8, massive Federal financial support has been provided for the construction of municipal waste treatment facilities. Nevertheless, it became apparent that the continued massive investment of Federal funds would not be sufficient to meet national goals for clean water unless steps were taken to assure that these construction grants were based on sound cost-effectiveness principles.

To maximize cost effectiveness of Federal investments, Congress required that "no grant shall be made for any project . . . unless such project shall have been approved by the appropriate State water pollution control agency . . . and unless such project is included in a comprehensive program . . . and . . . is in conformity with the State water pollution control plan . . ." This provision resulted in the promulgation of regulations requiring that EPA construction grants be awarded only for those projects included in current and effective River Basin and areawide water quality management plans.

FEDERAL WATER QUALITY PROGRAMS

Presently four Federal agencies provide grants or loans for planning and construction of water, sewer and/or waste water treatment facilities. EDA and FHA administer grant and loan programs primarily serving nonmetropolitan areas, while HUD and EPA operate grant programs for both metro and nonmetro areas.

Environmental Protection Agency

*The programs administered by EPA's Office of Water Programs (OWP) are primarily concerned with encouraging the construction of adequate waste water treatment facilities. The basic construction grant program, authorized by Section 8 of P.L. 660, provides Federal funds ranging from 30 to 55 percent of the cost of municipal waste water treatment facilities.

*OWP administers the basic planning grant program under Section "3c" of P.L. 660 supporting the development of comprehensive river basin and areawide water quality management plans. Fifty percent of the cost of the planning must be provided by State and local governments.

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*In the order mentioned above, the legislative references are superseded by Title II and Title I, Sections 102 and 106, under the 1972 Amendments of the Federal Water Pollution Control Act, P.L. 92-500.

*Annual State Program grants under Section 7 of P.L. 660 are also administered by OWP. These grants provide basic support to State water quality agencies to assist them in prevention and control of water pollution.

Department of Housing and Urban Development

HUD makes grants to assist and encourage communities to construct adequate basic water and sewer facilities to promote orderly development. This program applies primarily to urban areas of greater than 5,500 population. Grants cannot be made for the construction of "treatment works" which are eligible for assistance from EPA. HUD grants generally cover 50 percent of the approved project cost, but can, under certain circumstances, cover up to 90 percent.

Planning for these programs is supported by HUD's "701" Comprehensive Planning Assistance Program and is tied into HUD's Areawide Certification Requirements.

The Farmers Home Administration

FHA administers two grant programs which bear directly on water quality management planning in nonmetropolitan areas:

Comprehensive Areawide Water and Sewer Planning Grants for Rural Communities; and

Water and Waste Disposal Systems Grants and Loans for Rural Communities.

Both programs have been limited to rural areas and towns up to 5,500 population.

FHA has not formally entered into an agreement with HUD and EPA on unification of planning requirements.

Eligible applicants for FHA planning grants include any municipal government and public bodies such as regional and local planning commissions, provided they are broadly based and representative of rural interests, and propose a plan that is supported by local officials and public and private agencies interested in water/sewer facilities development in the area. Until recently, grant recipients must have had authority to prepare official comprehensive plans.

FHA planning grant assistance is usually for the total cost of the project. To receive a planning grant, the applicant agency has been required to submit evidence of authority to prepare official comprehensive plans, and evidence that resources are not available to finance the planning effort.

FHA facilities grants and loans can be awarded to public or quasi-public bodies and not-for-profit corporations. Grants and loans for waste disposal systems may be used for the installation, repair, improvement or expansion of sewer lines, waste collection, and treatment of all wastes in rural areas and towns up to 5,500 population. Grant assistance is limited to one-half of the project cost. Loan and grant assistance may cover the total project cost if the applicant is financially unable to contribute a part of the cost. To be eligible for grant assistance, the project must be consistent with a comprehensive areawide water and sewer plan for the area.

Economic Development Administration

EDA makes basic and supplemental grants and loans for the construction of public works and economic development facilities in designated geographic areas with high unemployment and low per capita incomes. The basic EDA grant is for 50 percent of the project cost, may be increased up to 80 or even 100 percent in severely depressed areas that cannot match Federal funds. Long-term loans may be made when reasonable financing terms are not otherwise available from private lendors.

EDA supplemental grants are made to increase the total Federal share of the project cost in designated areas. The applicant must apply for all available assistance from other Federal agencies before EDA will make a supplemental grant.

Throughout the history of the EDA program, approximately 70 percent of total public facilities grants have involved water and sewer projects. EDA can support such facilities provided the project improves opportunities for industrial or commercial development, otherwise assists in the creation of additional long-term employment opportunities, primarily benefits the unemployed or low-income families, or furthers the objectives of the Economic Opportunity Act of 1964.

FEDERAL PLANNING COORDINATION

This portion of the report deals with the planning requirements and the coordinative efforts of the four Federal agencies which fund water quality improvement facilities. Each agency (EPA, HUD, FHA and EDA) operates under its own Congressional mandate and, until recently, each has approached the question of planning requirements in its own way. Although all four agencies have been discussing ways to improve coordination of planning, only two—EPA and HUD—have reached joint agreement.

The signing of this "Joint Agreement for Interagency Coordination in Planning and Development" on June 7, 1971, represented a significant step in implementing planning unification. This agreement provides for "coordinated administration of comprehensive and functional planning and construction grant requirements." Grants awarded by HUD and EPA "must meet the same administrative and regulatory requirements with respect to comprehensive and functional planning, and programming of waste water collection and treatment systems."

In January 1971 EPA issued "*Guidelines—Water Quality Management Planning*," to implement EPA's regulations 18 CFR 601.32 and 33 published on July 2, 1970. The regulations state that "no grant shall be made unless the project is included in an effective current basin-wide plan for pollution abatement." The regulations further provide that "a grant for a project shall not be made "unless . . . such project is included in an effective metropolitan or regional plan . . . and certified by the governor or his designee as being the official pollution abatement plan . . . for the metropolitan area or region . . ."

The Guidelines call for both the basin and areawide metropolitan/regional plans to be completed and in effect by July 1, 1973.

Finally, the Guidelines envision the creation of an intergovernmental management system to accomplish the most cost-effective solution to local water quality management. The intergovernmental planning process involves the development of water quality management plans on two distinct but related geographic scales: 1. Basin hydrological systems; and, 2. Metropolitan/Regional (M/R) planning areas.

River Basin plans define the total water discharge allowable from each metropolitan/regional area and for the M/R plans to define the most cost-effective solution for achieving this permissible level. Thus, the M/R Plan must allocate each waste discharge according to the most cost-effective regional system, consistent with the overall strategy defined in the basin plan.

To support implementation of this kind of planning process at the M/R level, the Guidelines also call for M/R planning organizations to concentrate on the institutional arrangements necessary to implement the Metropolitan/Regional Plan and the Basin Plan. Finally, the Guidelines envision the effective application of the "A-95" Clearinghouse function at the M/R level in establishing coordinative relationships between institutions to assure that Federal planning and construction grants are consistent with areawide comprehensive planning and water quality management planning.

To date, EPA and the States have concentrated on water quality management planning for river basins, carried out primarily by the States, and for metropolitan areawide planning. Little attention has been given nonmetropolitan areas.

Implementation of EPA-HUD joint agreement

The tri-State survey found that little progress has been made in implementing unification of HUD-EPA planning requirements.

The major problem appears to be the relationship between HUD-required areawide functional water/sewer facilities plans and EPA-areawide Water Quality Management Plans.

Chapter 1, Paragraph 6, B. of the EPA Guidelines for Water Quality Management Planning States:

> Areawide (Metropolitan/Regional) Plans. These areawide plans are subsets of the Water Quality Management Plan for a river basin *and are the functional waste water collection and treatment (sewerage) plan elements of the comprehensive areawide Plan as set forth in the HUD Areawide Planning Requirements.* (emphasis added)

This language appears to be clear enough. EPA Areawide Water Quality Management Plans and HUD areawide/sewer facilities plans are to be the same. One plan should be prepared to meet the requirements of both agencies.

This interpretation is supported by the language of Paragraph 4, B. of the EPA Supplementary Guidelines issued in September, 1971:

> HUD certifies metropolitan/regional water quality managements plans, after EPA has found them acceptable, as meeting the functional planning and programming criteria for water and sewer facilities as set forth in HUD's Circular Series MPD 6415 (July 31, 1970).

Yet, no State or areawide planning official interviewed during survey felt that a HUD water/sewer functional plan element and an EPA areawide Water Quality Management Plan were the same. Similar responses, with one notable exception, were expressed by those EPA and HUD Regional and Area office personnel interviewed.

Several factors which were identified in the survey help account for problems in implementing unification:

1. The type of areawide water/sewer plans approved by HUD to meet the requirements for functional waste water collection and treatment systems planning (Certification III) varies greatly. Some are primarily a facilities inventory. Others are approved as preliminary plan elements with an action program for implementation. Some deal with water supply, sewers, storm drainage, and treatment systems, while others only cover some of these facilities systems. Some approved water/sewer plan elements include interim programs for sub-areas of HUD-designated Areawide Planning Jurisidictions (APJs). Others include action programs for the entire APJ. This diversity makes it even more difficult to unify HUD and EPA requirements.

2. There is no consistency in the geographic coverage of HUD and EPA plans. EPA's interim procedures allow for designation of sub-APJs for the purpose of awarding EPA construction grants. Under this procedure, interim water quality management plans are often prepared for a municipality and its environs to meet EPA's planning requirements.

However, HUD generally requires areawide water/sewer functional plans for larger APJs. Often the larger APJ is the entire area served by the Areawide Planning Organization.

3. For communities to remain eligible for HUD facilities grants, a HUD-approved areawide water/sewer plan element was required as of July 1, 1972. Although the HUD deadline has since been moved back, "fully developed" plans to meet EPA's requirements are not required until July 1, 1973. In the meantime, EPA is operating under "modified" interim procedures. Thus, in order to meet the earlier HUD deadline, the survey found that HUD offices were approving water/sewer plan elements with little consideration given to EPA's water quality planning requirements.

These factors all contribute to the confusion concerning the required content of the two agencies' plans and the standards employed to evaluate them. Most of the HUD and EPA Regional and Area Office officials interviewed feel that both the planning procedures and objectives of the two plans are significantly different. They point out that HUD water/sewer plans are service-oriented, while EPA plans are concerned with the technical performance of the sewerage facility. Priorities for HUD facilities grants are based on areawide or local considerations set forth in the areawide water/sewer plan element. Priorities for award of EPA construction grants are determined on the basis of basin and interbasin considerations. In addition, the Guidelines for Water Quality Management Plans call for planning standards and procedures which are more rigorous and technically oriented than those required by HUD for areawide water/sewer planning.

The survey found only one area where a real effort was being made to satisfy both HUD and EPA requirements through one planning process based on one set of planning procedures—the unified Guidelines. This effort was funded by an EPA "3c" grant to an areawide planning agency which had not undertaken a HUD-supported water/sewer planning element. However, HUD officials were ambiguous when asked if such an approach would meet HUD's functional water/sewer planning requirements.

In another area, the areawide planning agency was applying for a "3c" grant from EPA to expand its on-going HUD water/sewer planning to meet EPA's areawide water quality management planning requirements. However, there was no evidence that this approach has been frequently used in nonmetropolitan areas.

Farmers Home Administration

The survey found that FHA's approach to comprehensive rural water/sewer planning is undergoing substantial change to meet the need for coordinated areawide water/sewer/water quality planning and programs. In the past, FHA has usually funded single-county comprehensive water/sewer plans in rural areas. FHA contends that the failure of many States to adopt legislation establishing substate planning agencies often prevented funding of areawide or multicounty water/sewer plans due to the statutory mandate that FHA planning grants must be awarded to organizations with authority to prepare official plans. According to FHA officials, it has always been their policy to fund areawide planning agencies whenever the agency has the legal basis to prepare official plans.

Single county plans. The survey found that FHA plans, prepared and completed on a single-county basis, are often criticized by Federal, State and local planning officials as being deficient in several respects. Typical of the comments obtained:

> They were prepared by consultants with little input in the form of citizen participation or guidance from local officials;
>
> They often represented no more than a "needs" study, but with a system designed for every small town regardless of the actual need;
>
> The goal of these FHA plans was often merely to justify FHA facilities grants and loans;
>
> They often failed to establish priorities for implementation;
>
> They often were not coordinated with HUD and EPA planning for the same areas; and
>
> The bulk of the planning effort was usually devoted to the "comprehensive" component dealing with general background information about the area, with less emphasis placed on the design of physical systems.

Areawide planning. The survey found that FHA's areawide approach to rural water/sewer planning is resulting in better coordination with other Federal and State programs related to water quality management. In all three States, FHA State Office officials are taking the initiative in coordinating both FHA planning and facilities grants and loans with EPA, HUD and EDA water/sewer programs.

In some States, areawide planning agencies are being funded simultaneously with HUD and FHA grants. In these instances, nonmetropolitan planning agencies can integrate water/sewer planning for the entire area using HUD funds for urban areas not eligible to be included in FHA plans. In addition, the "comprehensive" planning data required by HUD can be used to meet FHA planning requirements and vice-versa. Finally, one set of plans, covering land-use, population and economic studies, and areawide rural-urban water/sewer facilities, can be developed to meet both FHA and HUD requirements.

However, this approach to HUD-FHA coordination has not been widely utilized to date. In many areas, the problems of integrating on-going HUD areawide water/sewer planning with completed FHA single-county water/sewer plans for rural areas and smaller towns is proving to be a difficult task.

FHA-EPA planning coordination

In all three States surveyed, FHA was attempting to build into its planning contracts with nonmetropolitan areawide planning agencies some of EPA's areawide water quality management planning requirements. Most commonly, the elements include a preliminary land-use sketch plan, location of waste discharges, applicable water quality standards, identification of where these standards are not being met, an evaluation of the adequacy of existing treatment facilities to meet long-term water quality standards and water uses, opportunities for regionalizing municipal waste treatment facilities, future treatment facilities needs and the anticipated impact on water quality standards, and an assessment of the plan's impact on the environment.

Some FHA planning contracts also require the development of a general abatement program for water pollution control in the planning area, and a detailed abatement program for waste water disposal for each community in the area under 5,500 population.

On July 17, 1972, FHA informed its State Directors that all FHA funded water and sewer plans must be reviewed by the appropriate State water pollution control authority to determine if the proposed plan is consistent with applicable water quality standards. The survey found that such reviews had previously been required by some FHA State Officers to assist areawide planning agencies with EPA water quality planning requirements.

While this procedure may be of some benefit to areawide planning staffs in terms of advice and technical assistance concerning EPA requirements, it does not assure coordination between FHA areawide water/sewer planning and on-going river basin planning conducted at the State level. In the past, most FHA contracts left the local planning agency with the burden of assuring that adequate coordination is accomplished. The survey found that this approach did not result in adequate river basin-FHA planning coordination. New FHA directives issued in 1972 appear to call for FHA State Offices to play a stronger role in assuring intergovernmental planning coordination for waste water collection and treatment systems.

With regard to FHA grants for construction of water and waste disposal facilities, the survey found little relationship between FHA water/sewer projects and FHA comprehensive water/sewer plans, even though the statutory provisions for this program require that projects must be consistent with a comprehensive water or sewer development plan for the rural area. Furthermore, FHA grants and loans for rural water systems are usually made without any direct coordination with the State water quality agency concerning water quality considerations. In some cases where construction of a water system is tied in with the construction of a collection system, the State water quality agency must approve the project. Ordinarily, however, plans for FHA-funded rural water system projects are not reviewed by State water quality agencies unless an increase in treatment is required. For those water systems that involve disposal through septic tanks, State Departments of Health usually serve as the agency responsible for plan review and approval.

Where FHA grants and loans are made for construction of collection and/or treatment systems, the survey found that procedures for linking these projects with water quality planning are evolving. Some State water quality planning agencies review and approve all engineering plans for the construction of collection and treatment systems. In one State, FHA has even set up a priority system for waste disposal system construction grants and loans based on the State's priorities for municipal waste treatment needs, as set forth in the State's Section 7 Annual Program Plan for EPA. In this instance, joint funding of rural treatment projects among FHA, EPA or State water quality program funds is the usual procedure. This joint funding of FHA projects provides a means of coordinating FHA sewerage projects with EPA water quality management planning, since an EPA Section 8 grant can only be awarded if the project is included in a River Basin and areawide Water Quality Management Plan and is included in the State's list of annual priorities.

In summary, the survey revealed that FHA State Office officials are using a variety of techniques to coordinate FHA funded water/sewer planning projects with other Federal agencies involved in water/sewer planning and with State water quality planning agencies. While some deficiencies in coordination still exist, the progress being made in intergovernmental coordination is encouraging. Although the standards for FHA comprehensive rural water/sewer planning requirements do not meet EPA standards for water quality management planning, an attempt is being made on the part of FHA officials to coordinate FHA planning requirements with those of EPA.

Economic Development Administration

EDA requires that the area for which an EDA supported project is to be undertaken have an approved Overall Economic Development Program (OEDP) and that the proposed project be consistent with it. The OEDP is the basic locally developed comprehensive planning document for all EDA programs. OEDP's are prepared on the basis of single-county redevelopment areas or for multicounty Economic Development Districts (EDDs). An OEDP contains basic physical, economic and demographic data for the area, an analysis of the area's natural and community resources, goals and objectives for the area and a detailed strategy for economic growth, a work program setting forth planning and project priorities, and the designation of cities and towns in the area as economic growth centers. EDA is currently developing guidelines for the preparation of an environmental assessment which will be part of the OEDP process.

EDA also requires that the initial project application must show how the project will contribute to the economic development of the area. This requirement is satisfied through an estimate of the number of persons that will benefit from the project, either directly, or indirectly as employees of firms using the facility.

Planning coordination. Although EDA provides both basic and supplemental grants for a large variety of public works projects, the survey indicated that EDA sewerage facilities grants are often used to supplement basic grants from FHA, HUD or EPA. In some cases as many as three agencies provide grant assistance for a collection and treatment system project. In the case of EDA supplemental grants, the applicant must comply with the planning requirements of the agency providing the basic grant support. Where two or more agencies jointly fund a project, a lead agency is usually selected to assure that the appropriate planning requirements are met. This procedure provides for coordination of EDA's sewerage facilities grants with the planning requirements of other Federal agencies.

The survey showed that EDA does not often make the basic grant for a sewerage facility unless FHA, HUD and EPA cannot or will not fund the project. When EDA makes the basic grant, the project is not ordinarily included in the water quality management plan for the area. Only where the State water quality planning agency has approval authority over plans for collection and treatment systems projects and uses it to assure that EDA projects are consistent with appropriate water quality management plans, are EPA's planning requirements met.

The survey showed that EDA most often supplements FHA grants or loans for water and sewer facilities. Here again, there is no assurance that the project will be consistent with water quality management planning for the area. Only where EPA jointly funds a project with EDA is there reasonable assurance that the project will be consistent with the appropriate water quality plans.

EDA areawide comprehensive planning and organizational requirement. A more serious obstacle to unified planning requirements results from the differences between EDA's requirements for an Economic Development District organization and HUD's district organization requirements.

EDA does not require EDDs to meet certification requirements similar to HUD's regarding organizational, and comprehensive functional Areawide Planning Requirements. As a result, a significant number of EDDs across the country have not been certified by HUD. Most of these uncertified EDDs are not likely to meet HUD's Areawide Planning Requirements for Certification until and unless they receive HUD '701' Comprehensive Planning Assistance grants.

The main conflict between EDA and HUD planning requirements centers on the type of planning which HUD requires. EDA does not require a land use plan, a housing element, or a functional water/sewer plan element as does HUD. Since EPA has adopted HUD's organizational and planning requirements, many nonmetropolitan counties and municipalities served by non HUD-certified EDDs will not be eligible for EPA Section 8 Construction Grants for waste treatment facilities once the EPA-HUD Guidelines for Water Quality Management Planning are fully implemented.

STATE INSTITUTIONAL ARRANGEMENTS

The provisions of PL 660 give the States prime responsibility for developing the most effective internal institutional arrangements for achieving water quality objectives.

The States rely on several administrative devices to achieve their objectives:

Designation of appropriate State agencies to administer the State's water pollution control activities and to accomplish the requirements for river basin planning;

Preparation of the Annual State Program Plan, covering all aspects of water pollution control for the coming year, including goals, planned activities, funding sources, budget levels, and legal authority; and State's strategy and schedule for accomplishing EPA requirements for River Basin and Metropolitan/Regional Water Quality Management Plans; and one and five-year schedules of priorities for Section 8 construction grants to meet the State's "Municipal Waste Treatment Needs;"

Designation, in cooperation with EPA and HUD, of areawide planning organizations to accomplish the necessary areawide Water Quality Management Plans; and,

Certification that the State's areawide and River Basin Water Quality Management Plans are consistent and conform with State programs.

Through these management devices, a pattern for water quality management is evolving geared to each State's particular experience, problems and existing institutional arrangements. In response to the goals of various Federal programs, and to the administrative procedures and regulations promulgated to implement them, the management systems in each of the States have certain similar characteristics. All function within a framework of intergovernmental cooperation to achieve certain national goals, And all utilize similar administrative processes, e.g., State program plans, water quality standards, discharge permits, etc.

In many States, separate agencies have been established to deal with water supply, water pollution control, water use, and other natural resources. When all water-related planning and programming are considered, there are few State agencies whose programs do not have an impact on, or will not be directly or indirectly affected by water quality management planning. The most obvious examples include agencies whose mission concerns economic development, community services, and comprehensive State planning.

State agency roles

From the findings of the survey and a cursory review of designated State agencies, it appears that more and more States are consolidating environmental control activities (air, water and solid waste) into a single agency. Two dominant characteristics were identified in these environmental protection agencies:

Most are relatively new, representing consolidation of formerly fragmented activities administered through different functional agencies.

Most have a legislative mandate to combat pollution through a strong regulatory function.

In effect, many States have only recently made pollution control and environmental enhancement a priority mission of State government.

The result has been two-fold:

1. Pollution control agencies have adopted a regulatory approach to water quality problems in reaction to increasing public demands to clean up the environment.
2. This approach has reflected a need to institutionalize their role and to gain the confidence of legislators, governors, Federal agencies and the public.

Thus they employ two basic policy tools:

1. Regulatory controls, such as establishment of water quality standards, issuance of discharge permits, permits for construction of waste water treatment facilities, and authority to issue cease-and-desist orders and to recommend civil penalties for polluters; and
2. Maximization of Federal grants and State funding for municipal waste treatment construction to clean up polluted waters as quickly as possible.

Throughout the brief experience of most of these agencies, they have had little time, funds, staff resources, or a legislative mandate to establish a planning function that meets the rigorous standards envisioned by EPA in the Guidelines. Instead, priority has been placed on building both public confidence and the institutional capability to carry out their statutory responsibilities. As a result, the planning function has received a low priority in most States.

These factors have made many State water quality planning agencies reluctant to undertake river basin water quality management planning or to encourage substate district agencies to become involved in areawide water quality management planning as called for in the Guidelines.

State water quality agencies have several complaints to justify their lack of progress in institutionalizing a State-Areawide planning process Depending on their particular circumstances, they complain of:

The lack of adequate Federal planning funds under Section "3c" of P.L. 600 to support required river basin and areawide water quality management planning;

The lack of flexibility in the Guidelines to allow for the establishment of a planning process to fit the needs of the State in terms of legal authority, water pollution problems, existing capabilities, and on-going planning efforts;

The failure of the Guidelines to clearly distinguish between the requirements for river basin and areawide water quality management planning;

The volume and technical quality of EPA-required in-stream data, which some States assert is not currently available;

The "arbitrary and unrealistic" time schedules for completion of fully developed river basin and areawide plans;

The inability of areawide planning agencies, particularly those serving nonmetropolitan areas, to develop areawide plans which meet the Guidelines' specifications.

Some of these complaints may well be legitimate, others provide an excuse for bureaucratic inaction. During field interviews the areawide agencies blamed State and Federal agencies; the States blamed the "Feds" and the areawide agencies, and so on in a pattern of diffused responsibility.

A major problem inhibiting the States' efforts to institute water quality management planning concerns the unfamiliarity of State water quality agencies with the concepts and purposes of management planning. This results in a corresponding failure to appreciate its long-range value. The field survey clearly indicated that many officials responsible for water quality management planning fail to appreciate the need for:

A dual planning function for river basin and areawide water quality management planning;

The necessary planning linkages between water quality management planning and other related functional planning activities (such as water resource planning, often carried out by a different State agency);

Relating water quality management planning to comprehensive State and areawide planning and development activities; and

A management planning process to assure maximum public benefit through the efficient and effective utilization of scarce resources.

Nevertheless, through incentives such as water quality management planning grants ("3c" grants) from EPA, and through the threat of losing eligibility for Federal construction grants under Section 8, the States have slowly moved to comply with EPA's planning requirements.

Differing State rules

Two basic but different strategies for meeting the requirements for water quality management planning at the State and areawide levels appear to be emerging.

1. A strong role for State water quality agencies in developing River Basin and areawide Water Quality Management Plans;
2. A strong role for substate areawide planning organizations in the development of River Basin and areawide Water Quality Management Plans.

By contrast, the EPA Guidelines clearly envision the establishment of a "balanced" State-areawide approach with clearly defined roles for State agencies concerned with water resource management and for substate areawide planning organizations, with coordinative mechanisms linking water quality management planning with other State and areawide planning and development activities. Just as clear, however, is the failure to date of many States to put into effect a balanced approach and, in many instances, to even conceptually grasp its necessity.

A strong State role. The States perceive certain advantages in the strategy they employ to accomplish EPA's planning requirements. The strategy selected usually reflects existing planning capabilities within the State. Where a strong State role is stressed, it is usually regarded as the most expedient approach to meeting EPA's requirements, maintaining continued eligibility of communities for EPA construction grants, and avoiding complex problems of State-areawide planning coordination. Such an approach does not tax the limited capabilities and funds of nonmetropolitan planning agencies and is most likely to be used where State water quality agencies have established some planning capability, and substate agencies are still new and have relatively weak planning programs.

However, the survey revealed that foreclosure of areawide planning agencies from full participation in the planning process has certain disadvantages. In effect, a key link in the intergovernmental management system envisioned by the Guidelines is left out. As a result, the necessary coordination of water quality planning with comprehensive development planning at the areawide level is not likely to be achieved. In addition, coordination of water quality planning with related areawide functional planning for water and sewer facilities supported by HUD and FHA is much less likely to be accomplished.

Finally, water pollution problems prevalent in nonmetropolitan areas such as soil erosion, agricultural run-offs, irrigation, mine drainage, septic tank drainage, animal wastes and natural weathering, are not likely to receive adequate attention in the planning process.

A strong role for substate agencies. On the other hand, the survey found indications that some States do accord their substate district agencies a major role in water quality management planning. This approach usually occurs in States where a strong district program has been in operation for some time.

This approach also has its drawbacks, however. The major disadvantage concerns the likelihood that the State water quality agency will tend to play a passive role in the planning process. If the State encourages its areawide planning agencies to set their own priorities and determine cost-effectiveness in a planning vacuum, implementation strategies and allocation decisions will be focused separately on each areawide planning jurisdiction.

Thus the States need to take an active role in influencing priorities by examining alternatives for each river basin, and establishing a management system that provides a framework for rational allocation of their resources among the several river basins. This can only be accomplished through an active State role in both river basin and areawide planning.

The survey also found that this approach is likely to result in the continued reliance of the States on their regulatory powers in water quality management rather than developing a strong planning function. While this strategy may result in pollution abatement, it provides no assurance of cost-effectiveness, which is the prime concern of management planning.

Finally, the survey found that a passive State role in the water quality planning process further inhibits the establishment of the coordinative mechanisms necessary to link water quality management planning with other State planning and policies in such areas as land-use and economic development, health (water supply), and the development and conservation of natural resources.

Interim planning

It should be emphasized that these approaches are those which the States can be expected to utilize in meeting the Guidelines' requirements for fully-developed River Basin and areawide Water Quality Management Plans. In some States these approaches are now being applied in initial efforts toward meeting EPA's requirements for fully-developed plans. Other States have made little progress in establishing a planning process to comply with the fully-developed planning requirements by the July 1, 1973 deadline.

At present, the States are complying with EPA's planning requirements by developing interim plans (provided for in the Guidelines) in line with supplemental guidelines contained in an EPA Memorandum dated September 20, 1971. This joint EPA-HUD supplemental communication stresses the need for flexibility, particularly for nonmetropolitan areas, in meeting the unified planning requirements through interim plans.

The field survey revealed that the States are also using diverse approaches to interim planning. Some States are relying on interim basin plans to maintain eligibility of their communities to receive construction grants under Section 8. These interim basin plans are usually geared to previous or on-going State planning efforts such as "pollution investigation surveys" and "water quality implementation plans," which consist of a statewide compilation of existing discharge permits, water quality determinations and schedules for construction of new facilities.

Other States are relying on interim areawide plans, which often consist of merely defining a sub-areawide planning jurisdiction for the applicant community and its environs based on a "logical service area" concept. These interim plans usually include basic population and demographic data and projections, available in-stream water quality data, which is often extremely sketchy and incomplete, and preliminary engineering reports prepared by a registered professional engineer.

Both approaches to interim planning are based on the States' regulatory powers and are often developed for the primary purpose of maintaining eligibility for Section 8 construction grants. Neither approach reflects a management planning process as envisioned by the Guidelines, but relies heavily on "grantsmanship" and State enforcement powers.

In some areas, however, water quality planning grants under Section "3c" have been awarded to both State and areawide agencies in an attempt to institute a dual State-areawide planning process. These grants are usually awarded after direct negotiation between the applicant and the EPA Regional Office. Since, in most instances, the negotiations for each planning grant have not been timed to coincide, State and areawide water quality planning agencies have no clear mandate for coordinating on-going areawide water quality planning with river basin planning conducted at the State level.

In other words, the mere establishment of a dual planning function at the State and areawide levels may result in serious conflicts between State river basin planning and areawide planning if the planning tasks undertaken at both levels are not closely coordinated within an overall policy framework of broad water quality goals and specific planning objectives to be accomplished at each level.

STATE A–95 CLEARINGHOUSES

In all three States surveyed, State Clearinghouses are functioning pursuant to OMB Circular A–95. The survey found that these State Clearinghouses are using the Project Notification and Review System (PNRS) called for in Circular A–95 to improve communication among agencies whose missions directly relate to water quality management.

All of these States had established procedures under PNRS to notify the appropriate State agencies of applications for Federal grants for water/sewer, and waste treatment planning and construction.

State Clearinghouses are attempting to coordinate functional planning for water/sewer and treatment facilities with comprehensive planning through the PNRS system. For instance, State water quality agencies are usually notified when a HUD '701' comprehensive planning grant to an areawide agency will be used to develop a functional water/sewer planning element. Usually, however, State Clearinghouse personnel are responsible for analyzing these functional-comprehensive planning linkages. For example, one State Clearinghouse was attempting to assure, through PNRS, that FHA water and sewer planning would be coordinated with areawide or local land-use planning.

In general, the survey found these agencies particularly active in attempting to coordinate Federal water/sewer-water quality planning and projects, either through the Clearinghouse function or through their role as the official State Comprehensive Planning Office. Some of the techniques that have been devised include:

The preparation by one State of a planning manual for water quality management which includes detailed step-by-step procedures for areawide water/sewer functional planning and areawide water quality management planning;

An attempt by one State Planning Office to define a stronger role for nonmetropolitan areawide planning agencies in the water quality management planning process by means of a specific work element in a HUD-funded Demonstration District program;

The development, by one State Planning Office in conjunction with the State water quality agency, of a set of guidelines to help local communities determine when regionalization of waste water treatment facilities is feasible; and the review of local project grant applications and interim basin plans through PNRS to determine if the criteria developed in these guidelines have been followed;

The formation of a committee, composed of personnel of State agencies whose missions relate to water quality, to coordinate river basin planning efforts among State agencies;

The organization of a river basin planning advisory committee composed of directors of all areawide planning agencies within the State to provide inputs into river basin planning being conducted by the State.

In addition to these formal procedures, the survey found numerous examples of more informal coordination efforts being employed by State Clearinghouse personnel. Since the State Planning Offices are usually responsible for administration of HUD "701" grants to nonmetropolitan areawide planning agencies, Clearinghouse personnel often provide liaison between these areawide agencies and State water quality agencies. In some States, Clearinghouse agencies are taking the lead in providing technical assistance and planning guidance to nonmetropolitan planning agencies concerning linkages needed to coordinate HUD or FHA supported water/sewer planning with EPA's water quality planning requirements.

In another instance, the formal PNRS precedures for water/sewer-water quality projects are being augmented by informal communications between personnel of the State Clearinghouse and the State water quality agency. In the same State, the State Clearinghouse is double-checking all applications for EPA Section 8 construction grants to determine if the State water quality agency has reviewed them for conformity with interim river basin plans. If any conflicts are noted, the planning section of the State water quality agency is alerted. In effect, the State Clearinghouse is attempting to establish communication linkages between the subdivisions within the State water quality agency.

Environmental inputs

The survey found that State Clearinghouse agencies are seriously involved in attempts to anticipate the long-range, secondary or indirect effects of development projects on comprehensive planning, State and Federal policies, and on qualitative considerations of community and economic development. These effects of current plans and projects have particular significance with respect to water/sewer and waste treatment planning.

The most convenient procedure available to State Clearinghouses for examining these secondary effects is through the provision of Circular A-95 calling for State and Regional Clearinghouses to secure the required State and local inputs to support the preparation of environmental impact statements required by Section 102 of the National Environmental Policy Act. State Clearinghouses often take the initiative in requiring the project applicant and the appropriate State agencies to prepare an environmental assessment of proposed water/sewer and waste treatment projects. These environmental assessments are then reviewed by the State Clearinghouse and, if appropriate, additional comments on their long-range and secondary effects are prepared.

Constraints to the effective administration of "A-95"

The survey found that personnel of State Comprehensive Planning Offices are more knowledgeable of the roles, relationships and planning linkages necessary to implement a water quality management planning process than personnel of most other agencies involved in water quality activities, including, in many instances, Federal agency representatives.

Yet several constraints were identified in some States which inhibit the effective use of the A-95 process. With specific reference to problems of coordinating water quality management planning, one State Clearinghouse was attempting to strengthen the role of Regional Clearinghouses in the PNRS process. However, since in this State, the State water quality agency had not involved areawide planning agencies in developing water quality management plans, the State Clearinghouse felt the regions could not perform an adequate review of water-related projects in their area for conformity with the applicable water quality management plans.

Another problem is the reliance of State Clearinghouse personnel on the adequacy of the A-95 review conducted by other "interested" State agencies, on which they depend for a thorough analysis of proposed projects. However, they have no direct means of assuring that these agencies consider all the project's ramifications. For instance, personnel of one State Clearinghouse are particularly concerned over what they view as the indifference expressed by the State water quality agency concerning grant applications for construction of water systems. Although all such applications are routed to the water quality agency for review, often no interest is expressed unless the capacities of the existing collection or treatment systems are involved. As a result, Clearinghouse personnel often feel that adequate consideration is not given to the long-range or secondary effects of the proposed water system.

Other problems identified which tend to inhibit the general effectiveness of A–95 include:

1. A severe shortage of funds and staff needed to effectively follow through on PNRS procedures to assure appropriate action is taken. All State Clearinghouses strongly advocated that Federal grants which support State comprehensive planning allow the administration of the A–95 function to be included as an eligible cost reimbursable with Federal funds.
2. In some States, Clearinghouse personnel feel that there are no statewide plans or policies to provide a coordinative framework within which all local project applications can be evaluated. As a result, they feel that the Clearinghouse process cannot be used to influence priorities and implement development objectives. This is particularly true regarding the assessment of secondary, indirect or long-range effects of plans and projects.
3. Clearinghouse personnel in States that have begun to formulate statewide policies for balanced growth and development complain of the lack of statutory authority to influence Federal agency decisions concerning funding of local projects. They assert that there have been few instances where Federal agencies have held up project grants to local applicants pending resolution of problems identified through the review and comment procedure.

In summary, a hierarchy of problems associated with the effective administration of the Clearinghouse process was identified. In some States, no plans or policies for evaluation of projects exist; in other States where they may have been developed, there is no legal or political authority to apply the planning criteria; and in States where adequate criteria and some leverage are available, funds and staff to administer the Clearinghouse process adequately are insufficient.

NONMETROPOLITAN AREAWIDE PLANNING

INTRODUCTION

This chapter is designed to portray the institutional setting in which planning related to water quality management occurs. Evolution of multijurisdictional substate organizations with broad or narrow functional purposes in response to Federal and State initiatives is traced in terms of principal Federal programs involved. Capabilities of district organizations, their varying relationships with other agencies and constraints on their functioning, stemming from their mixed heritage, are discussed in relation to the objectives of EPA's planning requirements.

Background observations are related to specific findings of the survey as pertinent points arise. Following are conclusions, emphasizing the role of OMB Circular A-95 in improving the intergovernmental process outlined in the chapter.

EVOLUTION

Over the past decade, comprehensive planning and development activities in nonmetropolitan areas have increasingly become the responsibility of various types of multijurisdictional substate development districts or similar organizations.

Although the creation of substate districts has, for the most part, been in response to specific Federal programs calling for areawide planning, the organization of multicounty districts had been initiated in a few States such as Georgia and Kentucky several years before the Federal Government began to promote their establishment.

By the mid 1960's, several Federal programs called for intergovernmental efforts supported by multijurisdictional areawide planning to solve the pervasive economic and social problems afflicting many communities throughout nonmetropolitan America.

Beginning with the passage of the Appalachian Regional Development program in 1965, Congress endorsed this concept by calling for the establishment of multicounty Local Development Districts (LDDs) to assist the Appalachian States and the Appalachian Regional Commission in planning a comprehensive development program for the region.

The Public Works and Economic Development Act of 1965 provides for the establishment of multicounty Economic Development Districts (EDDs) to perform areawide economic development planning in certain depressed nonmetropolitan areas. By 1966, the Office of Economic Opportunity had also begun to encourage the formation of multicounty community action agencies to plan and administer various components of rural community action programs.

The Department of Agriculture also began promoting multijurisdictional districts in the 1960's through the support of Resource Conservation and Development Project areas. In addition, several States began to administer their agricultural extension service programs on a multicounty "extension district" basis.

In 1968, Congress took another major step toward advancing the district concept by amending Section 701 of the Housing Act of 1954 to provide comprehensive planning assistance for nonmetropolitan district agencies. These amendments also called for the Department of Agriculture to provide technical assistance in establishing these districts and to support their planning.

In addition to these multipurpose planning and development programs, Congress has authorized the formulation of single-purpose or functional areawide planning agencies in nonmetropolitan areas such as areawide comprehensive health planning agencies and regional law enforcement planning councils.

The evolution of areawide planning and development agencies in nonmetropolitan areas was influenced by several factors. Initially, districts were organized in economically declining rural areas to provide for increased cooperation and for merging of financial and technical resources of hard-pressed local governments to promote economic development.

The States and the Federal Government soon realized the potential of development districts to undertake the planning of development activities that could only be successful if applied on a larger areawide or regional scale. Finally, the multijurisdictional district agency has been recognized as a potential key governmental mechanism to solve a growing array of problems—such as environmental pollution—which transcend the boundaries of any single jurisdiction.

Since 1965, nine Federal programs affecting nonmetropolitan areas and calling for an areawide planning function have been put into operation. Eight have sponsored the formation of multijurisdictional planning agencies to perform areawide planning. At least three have sponsored comprehensive areawide planning organizations—LDD's, EDD's and HUD's nonmetropolitan districts (NMDs). The other federally sponsored multijurisdictional planning organizations operating in nonmetropolitan areas administer special-purpose planning programs with more narrow objectives such as health care, law enforcement and resource conservation.

The proliferation of these federally supported districts—often overlapping many special-purpose districts used by State agencies to administer certain programs—created an urgent need for a single set of areawide planning jurisdictional boundaries. In the late 60's the Federal Government began to recognize the need to establish a uniform system of substate districts with consistent geographic boundaries to plan and manage both Federal and State programs requiring areawide consideration. Bureau of Budget Circulars A–80 (in 1967) and A–95 (in 1969) require Federal agencies, whenever possible, to use State-designated planning and development districts in administering programs with areawide planning requirements. This Federal action has encouraged the official designation of statewide systems of substate districts in over 40 States as of mid-1972.

Each Federal program providing basic support for nonmetropolitan districts has its own requirements for organizational structure, planning procedures, funding arrangements and citizen participation. In addition, the States with a system of substate districts usually have their own requirements for district planning and development activities, set forth in legislative acts, executive orders, or regulations and guidelines issued by the State agency responsible for managing the State's district program. In some States, district organizations have been established under interlocal cooperation statutes. In these instances, the participating local governments determine the functions of the district agency.

COMPREHENSIVE AND FUNCTIONAL PLANNING

The three State survey indicated that nonmetropolitan planning and development organizations are not yet actively involved in the water quality management planning process. Of the 20 such agencies currently operating in the States surveyed, only two are currently funded with "3c" planning grants from EPA. In one instance, the grant is for the preparation of a Metropolitan Water Quality Management Plan, where one SMSA fringe county falls within the planning jurisdiction of a nonmetropolitan planning agency. There is little doubt that this pattern of "3c" funding exists nationally, given the limited funds available and the current emphasis on metropolitan water quality planning.

However, many nonmetropolitan agencies are engaged in comprehensive and functional planning activities which directly relate to water quality management. The field survey concentrated on four aspects of current planning efforts in nonmetropolitan areas to indicate the problems and potentials of involving them in the formulation of fully developed areawide Water Quality Management Plans:

1. Comprehensive planning activities currently being undertaken by nonmetropolitan areawide planning and development organizations.
2. The current status of these agencies in meeting HUD's Areawide Planning Certification Requirements.
3. Their involvement in related functional planning such as water/sewer and natural resources planning.
4. Their role in coordinating Federal and State planning and development activities carried out within their planning jurisdiction.

In most States, State policy has been directed toward creating district organizations to serve as the single areawide agency to administer Federal and State multijurisdictional planning and development programs. As a result, many of these organizations administer several comprehensive and functional planning programs, funded in part by Federal planning grants.

Areawide comprehensive planning

Planning grants under EDA's Economic Development District (EDD) program and HUD's "701" Comprehensive Planning Assistance Program to nonmetropolitan districts (NMDs) are the most common in nonmetropolitan areas.* They support comprehensive planning and are used primarily to employ professional planning staffs and consultants to accomplish the planning required under each program.

Most well-established EDDs and NMDs have been able to receive and/or coordinate additional functional planning grants through the staff capability "bought" with their basic EDA or HUD planning grants.

Economic Development Administration. Under the Economic District Development Program, areawide planning and development districts are organized with a governing board composed of local elected officials and representatives of the areas' major economic interests including the unemployed, minorities, business, labor and civic groups. To be designated an EDD, the district organization must prepare an Overall Economic Development Program (OEDP) approved by the State and EDA.

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*In the Appalachian Region, nonmetropolitan planning is also supported by planning grants from the Appalachian Regional Commission to support the activities of Local Development Districts.

A district's initial OEDP, once approved by EDA, must be updated annually, listing priority projects to be undertaken to help accomplish the goals and objectives set forth. Subsequent EDA grants and loans to the area for public facilities must be consistent with the OEDP and have a demonstrable effect on reducing unemployment or otherwise alleviating poverty in the district.

Department of Housing and Urban Development. The planning requirements for nonmetropolitan areawide planning under the HUD '701' Comprehensive Planning Assistance Program are more complex. Initially, a HUD NMD must satisfactorily complete an Overall Program Design (OPD) and an Annual Work Program.

The OPD consists of a three-to-five-year overall program of work to assure that work elements relate to overall planning objectives, that staff, time, and financial resources are effectively programmed, and that planning tasks are undertaken in logical sequence.

The Annual Work Program includes a schedule of specific planning activities to be undertaken during the current funding period.

Areawide certification

In order to continue to receive "701" Comprehenisve Planning Assistance grants and in order for communities within the Areawide Planning Jurisdiction to be eligible for HUD water and sewer facilities grants, areawide planning agencies must make satisfactory progress toward meeting HUD Certification or Areawide Planning Requirements.

The satisfactory accomplishment of HUD's Areawide Planning Requirements is a key feature of the unification of EPA and HUD planning requirements. In an attempt to achieve coordination of areawide water quality management planning with areawide comprehensive and functional planning funded under the HUD "701" program, the Guidelines require that projects funded by HUD for water and sewer facilities and by EPA for waste treatment facilities conform to the same requirements for both comprehensive and functional planning. To implement unification, the Guidelines call for Areawide Planning Organizations to meet HUD's Areawide Planning Requirements prior to the award of an EPA or HUD grant for waste water collection or treatment facilities. If fully implemented, the HUD-EPA unified Guidelines will require that no facilities grants be awarded by either agency until an APJ has been defined and an APO has been designated and fully certified by HUD.

HUD determines that planning agencies have met its areawide planning requirements by certifying their planning accomplishments and competence at three levels. Level I concerns certification as the official Areawide Planning Organization (APO); Level II indicates that the areawide agency has met HUD's comprehensive planning requirements; and Level III indicates that the agency has received HUD certification for areawide functional waste water collection and disposal systems planning.

The Guidelines envision that in awarding Certification III, HUD and EPA will determine if the APO has met both EPA's water quality management planning requirements and HUD's requirements for functional water/sewer planning and programming.

The current status of HUD Certification of nonmetropolitan areawide planning organizations varies greatly from district to district and State to State. The survey indicated that, while a few nonmetropolitan districts have completed the necessary planning tasks to receive HUD Certifications I through III, others have not as yet received Certification I. In addition, nonmetropolitan areawide planning agencies in several States are not involved in the HUD "701" Comprehensive Planning Assistance Program and, as a result, do not expect to receive HUD Certification in the near future.

Although the administration of HUD's areawide planning requirements varies somewhat from State to State, HUD generally requires the following planning tasks be accomplished to receive Certification II and III:

Preparation of a comprehensive areawide land-use element;

The establishment of areawide goals and objectives;

The compilation of basic population, demographic and economic data and projections;

The completion of a preliminary water/sewer planning element.

The capability of existing NMDs to complete the necessary planning tasks for HUD Certification varies considerably depending on:

1. The level of HUD funding. The larger the "701" grant, the more staff the district can employ to undertake HUD's planning requirements.

2. The total level of all Federal planning assistance supporting comprehensive and functional planning administered by the district agency. In districts that receive planning funds from both EDA and HUD, more staff resources are available to undertake the required planning.

However, the timing of the two planning grant programs is important here. For instance, if a new nonmetropolitan planning organization received concurrent planning grants from HUD and EDA, the district would be hard-pressed to meet their planning requirements simultaneously since the requirements of both agencies differ significantly. The field survey indicated that the most successful districts, in terms of planning accomplished, first received an EDA grant and completed the preparation of an OEDP. Subsequently, these districts received HUD "701" planning grants and were able to combine these funds with continuing planning funds from EDA to satisfy HUD's planning requirements.

3. The physical, demographic and political characteristics of the planning area. In the most rural or sparsely populated planning areas, district boards are sometimes reluctant to undertake some HUD-required planning, which some feel is geared more to the problems of urban or rapidly growing areas. This is particularly true concerning HUD's requirements for an areawide Land-Use Element, which is often resisted by some rural interests. Even where there is no overt opposition to land-use planning and zoning, local officials in sparsely settled rural areas are often reluctant to commit the necessary funds and staff resources to the Land-Use Element which they feel is not an urgent planning priority.

4. The existing problems and planning priorities of the nonmetropolitan planning agency. In many nonmetropolitan areas,

the district planning agency was created primarily to promote economic development. As a result, they may be reluctant to meet HUD's Areawide Planning Requirements, especially if they are not receiving HUD "701" planning assistance.

5. The total staff and technical planning assistance resources available to the district organization from State and other Federal agencies involved in related planning and development. In some nonmetropolitan areas, the district organizations receive the active support of Rural Development Committees organized under the auspices of USDA. Other districts which have been successful in gaining the active support of Extension Service agents and Soil Conservation Service County Agents are in a much better position to undertake HUD planning requirements. In some nonmetropolitan areas, USDA has supported establishment of multicounty Resource Conservation and Development project areas coterminous with nonmetropolital districts. These RC&D's represent a potential source of additional staff assistance which, through proper coordination, can support the planning objectives of the district agency.

Finally, in some States, a program of State technical staff assistance is available to areawide organizations which can be used to support district planning objectives.

Related functional planning

The survey revealed that nonmetropolitan district planning agencies are currently engaged in several kinds of functional planning directly related to water quality management.

1. Areawide land-use planning, usually undertaken with Comprehensive Planning Assistance Grants from HUD;
2. Areawide water and sewer facilities planning supported with HUD "701" planning funds and/or planning grants from the Farmers Home Administration;
3. Economic and industrial development planning, usually directly related to the OEDP planning process and public facility grants and loans from EDA.

The relationship of areawide land-use planning to water quality management is obvious and direct. The Guidelines call for areawide water quality management plans to provide the main input on land use, which is to be integrated into river basin plans. All nonmetropolitan districts receiving HUD "701" funds are required to prepare a Land-Use Element. While progress in this area varies greatly from district to district, most HUD-supported districts will usually complete at least a preliminary Land-Use Element within a year after receiving their initial HUD planning grant.

The majority of the districts contacted in the survey had recently completed, or were in the process of completing, an areawide water and sewer plan. The remainder were anticipating undertaking areawide water/sewer planning as soon as planning funds became available from HUD or FHA.

Economic and industrial development planning in nonmetropolitan areas invariably relates, directly or indirectly, to water quality management planning. In EDDs, a large percentage of project activity is centered around public facilities grants and loans from EDA to attract new industry. These projects often involve construction of water, sewer and waste treatment facilities with Federal grants from EDA, FHA, HUD and EPA. Even when EDA projects do not directly involve these types of facilities, the planning associated with economic or industrial development projects will usually need to address water quality considerations for either the immediate or long-range future.

AREAWIDE PLANNING COORDINATION

It is now the policy of most States, that, wherever possible, all Federal and State supported multijurisdictional planning and development programs should be administered directly by, or coordinated under the organizational umbrella of, officially designated substate planning and development organizations. Nevertheless, the extent to which areawide programs currently conform to this policy varies considerably from State to State. In some cases, the geographic boundaries of multijurisdictional programs are still not coextensive with substate district boundaries. In other instances, special functional planning structures have evolved independently from the official substate district organization.

Those districts responsible for and/or actually administering functional planning programs are usually in a position to play a stronger role in establishing the arrangements necessary to effectively relate comprehensive and functional planning. In some States a wide variety of functional planning programs, supported by Federal agencies, are administered through nonmetropolitan districts. These include planning grants for law enforcement (LEAA), transportation and highway safety (DOT), comprehensive health and human resources (HEW), historic preservation (Interior), manpower (Labor), and planning supported by the Council on Aging.

In addition, in some areas nonmetropolitan district agencies are working closely with Community Action Agency staffs supported by OEO. In some States, OEO is directly funding nonmetropolitan district agencies to administer Community Action Program components through special demonstration programs.

In nonmetropolitan areas served by areawide planning organizations, OMB Circular A-95 is the key mechanism for strengthening the institutional arrangements necessary to manage comprehensive and functional planning activities on an areawide and statewide basis. To bolster the role of areawide planning and development agencies in coordinating federally supported planning and development activities, most States which have officially delineated substate districts and recognized district organizations have designated them as Metropolitan of Regional (Nonmetropolitan) Clearinghouses to review and comment on applications for Federal assistance.

This Clearinghouse function is probably the single most important management tool available to nonmetropolitan planning and development organizations. It has bestowed on nonmetropolitan districts the necessary legitimacy to take a leadership role in comprehensive planning and development.

The field survey indicated that most planning officials in nonmetropolitan agencies understand the purpose of the Clearinghouse function and recognize its potential for improved management of planning and development efforts. The Clearinghouse role has been welcomed enthusiastically by district officials who recognize its potential as a management tool for accomplishing their mission, and a source of legitimacy advancing district acceptance as the "lead" agency in areawide comprehensive planning and development.

The effectiveness of A-95 at the areawide level is directly related to the progress the district has made in its overall planning and development program. The older, more mature districts, with a significant portion of their initial areawide planning efforts accomplished, have been able to effectively use the Clearinghouse function to help implement these plans. In the newer districts, the review and comment procedure is used primarily to establish the necessary communication linkages, to provide a mechanism for identifying obvious waste and duplication of efforts, and to strengthen the district's role and institutional capability to perform areawide comprehensive planning and coordination.

CONCLUSIONS

In evaluating the efforts of nonmetropolitan planning and development organizations, the most outstanding feature is the vast diversity from State to State and district to district. These differences extend to organizational accomplishments, funding levels, staff capabilities, and planning progress. For instance, in some areas district organizations are well established, funded and staffed, and have completed a significant portion of their basic planning tasks. In other areas, while a substate multicounty district may have been delineated, no planning organization has yet been formed, often due to political resistance on the part of local officials or conflicts over district boundaries. Often, this uneven pattern of organizational progress can be found within the same State.

Even in States where all nonmetropolitan districts have been organized, staffing capabilities, funding levels and planning accomplishments often vary considerably. The survey found district organizations with staffs ranging in size from one to ten professionals. As would be expected, those with the larger staffs were receiving more Federal funds and had completed more of their federally required planning.

Some similar characteristics of nonmetropolitan substate district agencies can be identified however. In most States, they have a sound legal basis under existing interlocal cooperation statutes or by specific act of the State Legislature. Almost all districts are organized through the voluntary participation of local governments. Few, if any, State laws grant district organizations the powers to implement their plans. The districts must persuade their participating local governments to officially adopt district plans.

District governing boards are usually representative bodies, composed of a majority of local elected officials with special provisions to assure citizen participation and representation of major economic and social interests. In some States, nonmetropolitan planning organizations have been organized as Councils of Governments, whose governing boards are composed exclusively of elected local officials. In these instances, special arrangements have been designed to encourage citizen participation.

District staffs are usually not large, averaging three of four professionals. Annual budgets range from around $40,000 to over $200,000. A small percentage of these funds comes from local contributions, usually not more than 35 percent of a district's annual budget. More than 20 States now support their substate district organizations with regular grants appropriated by the State Legislature. However, the level of State support is usually quite low. In two of the States surveyed, district organizations received only around $5,000 annually in State support in the form of a "block" grant for general planning and development purposes.

Most nonmetropolitan district organizations have been designated A–95 Regional Clearinghouses and practically all are authorized to undertake comprehensive planning and to coordinate functional planning with areawide comprehensive planning.

Functional planning in nonmetropolitan areas can be generally classified into three categories:

1. Physical planning, including land-use, natural resources, transportation,
2. Economic development planning, including industrial development, manpower training and provision of public facilities.
3. Human resource planning, including health, education, housing and community services.

The overlap of these functional planning components is obvious. It is in this area of planning coordination that nonmetropolitan districts have made the best use of their Clearinghouse role.

A prime tool for coordination of water quality management planning in nonmetropolitan areas is the A–95 Clearinghouse function. Although the administration of the A–95 review and comment function is criticized by some as a pro forma paper-shuffling exercise, the survey indicated that district planning officials understand its potential and are eager to employ the Clearinghouse function to further the planned development of their areas. As nonmetropolitan agencies become accepted, complete their basic planning tasks, and receive more State and Federal funding support, they will be able to use their Clearinghouse role to more effectively coordinate all types of functional planning and development activities, including plans and projects which relate to water quality management.

DISCUSSION OF FINDINGS AND CONCLUSIONS

Water quality management planning will have a significant impact on nonmetropolitan areawide planning and development activities. Conversely, the planning and development activities being undertaken by nonmetropolitan district organizations will have an important influence on water quality management. These activities include land-use, natural resources, housing, water/sewer and economic development planning.

IMPEDIMENTS

A major role for nonmetropolitan substate district agencies in the water quality planning process should result in improved areawide planning coordination, enable the States to improve the quality of river basin planning efforts, and facilitate implementation of water quality management plans at the areawide level. However, the field survey identified some major impediments to be overcome before a realistic management planning process can be put into effect in nonmetropolitan areas.

Federal-level impediments

One potential deterrent to coordination of water quality management planning is the lack of a comprehensive tie-in of all four federal agencies' grant programs for planning and construction of water and sewer systems. FHA and EDA which have a major role in funding water/sewer planning and projects in nonmetropolitan areas, have not entered into an agreement with HUD and EPA to unify planning requirements for Federally supported waste water collection and treatment systems projects. If a coordinated approach to these Federal water/sewer and water quality planning and construction programs is not established at all intergovernmental levels, the prospects for an effective water quality management planning process in nonmetropolitan areas will be seriously diminished.

However, the survey showed that even a limited attempt at unification of requirements of two Federal agencies at the Washington level—the HUD–EPA joint agreement—has not taken effect in many areas. Confusion over the relationship between HUD-required areawide functional water/sewer planning and areawide water quality management planning required by EPA proved the chief problem.

State-level impediments

Although the States are using a variety of approaches in attempting to comply with EPA's planning requirements, most State water quality planning agencies are not familiar with the concepts and purposes underlying water quality management planning and do not fully appreciate the need for a management planning process. As a result of past emphasis on their regulatory and enforcement function, these agencies often view EPA's planning requirements as another unnecessary exercise to perform in order for municipalities to remain eligible for Federal facilities grants.

To meet Federal planning requirements in an expeditious manner, some States have pursued a strategy of minimum involvement of areawide agencies in the water quality management planning process. Their rationale seems to be that if fewer agencies and levels of government are involved, less time needs to be spent in establishing coordinative processes and planning linkages, enabling the State to devote its limited funds and staff to meeting EPA's planning requirements as quickly as possible.

Illustrative of the thinking behind this approach is the statement in one State's Section 7 Program Plan that " . . . increased interagency coordination is generally equated with a decrease in work accomplished . . . ."

In those few States that contemplate a major role for substate district agencies in the water quality management planning process, expediency in meeting EPA's requirements again appears to be a major influence. This approach is most likely to be followed in States where little or no planning capability exists within the State water quality planning agency, and where substate planning agencies are relatively well established with strong planning programs.

Nonmetropolitan area level impediments

The survey revealed several impediments to full participation of nonmetropolitan substate district agencies in the water quality management planning process.

Local resistance. Planning officials and staffs of nonmetropolitan planning agencies are for the most part unaware of the need for water quality management planning. It is not enough that water quality management plans are now a Federal requirement for eligibility for EPA and HUD grants. Coping with, and at times circumventing, Federal requirements is a way of life for many nonmetropolitan district staffs.

This antipathy will persist until planning staffs and local officials become aware of the future impact water quality management planning can have on their on-going planning efforts and on the overall missions of their agencies. Incentives, both in the form of rewards and penalties, must be clearly presented to encourage their full involvement.

Nascent institutions. Even if nonmetropolitan district planning agencies fully accepted the need for water quality management planning, many would not now be in a position to meet EPA's current requirements for areawide Water Quality Management Plans. An already taxing work load and a shortage of qualified professional staff in many agencies will serve as a major constraint to the development of areawide Water Quality Management Plans in many nonmetropolitan districts

Even if the staff capability were available, however, most district agencies would not be ready to undertake planning as called for in the Guidelines. Many are still in the process of institutionalizing their role and completing certain basic planning tasks fundamental to the mission of a nonmetropolitan planning and development district agency. Some are still groping with the problem of gaining full cooperation and support from local officials and citizens. Others are still in the process of preparing OEDP's, initial Land-Use Elements, preliminary water/sewer plans, and establishing their A-95 role in areawide planning coordination.

Lack of planning grants. The general lack of Federal water quality planning grants ('3c' grants) for nonmetropolitan areas has further diminished the prospects for motivating nonmetropolitan planning staffs to become involved in the water quality planning process. District officials have adapted their programs and priorities to the realities of Federal categorical grants, which heavily support both planning and project activity in nonmetropolitan areas. This has resulted in planning priorities being determined, to a large extent, by the availability of Federal planning funds. This phenomenon has engendered an attitude to the effect that functional plans will not be undertaken unless supported by a categorical Federal grant for a specific planning activity.

Weak communication linkages. Communication linkages between nonmetropolitan district agencies and Federal and State agencies responsible for water quality management planning have not been well established. This has resulted in considerable confusion on the part of district officials concerning specific requirements for water quality management planning, the respective roles of State and substate district agencies in the planning process, and the relationship between on-going HUD and FHA supported planning and EPA's planning requirements.

Nonmetropolitan district agencies are often caught in the middle of rapidly changing patterns of Federal-State-regional communications. On matters concerning project implementation, district and local officials often deal directly with EPA regional officials. For purposes of water quality management planning, however, State water quality agencies have been delegated a key role. Nevertheless, the field survey indicated that these designated State water quality planning agencies have not taken the initiative to inform district agencies of State policy for implementing EPA's planning requirements and for setting priorities for municipal waste treatment facilities needs. In addition, little effort has been made by State water quality planning agencies to provide technical planning assistance to districts involved in water quality or related planning.

The communications problem is further aggravated when State water quality agencies are engaged in policy disputes with EPA Regional offices over standards, priorities and planning approaches. Where such conflicts exist, the flow of communications concerning policies, technical planning requirements, and intergovernmental relationships is short-circuited. At best, ad hoc patterns of communication often develop which fail to facilitate the intergovernmental coordination necessary to establish a unified management planning system. Often, however, no effective communication linkages are established, resulting in even more confusion.

In short, the impediments identified in the field survey can be classified into two major problem areas.

1. Nonmetropolitan district agencies are not currently active participants in the water quality management planning process as defined in the EPA Guidelines, and State water quality planning agencies are not actively fostering their participation.
2. Administration of Federal programs and planning requirements related to water quality management in nonmetropolitan areas varies significantly across the nation, resulting in a fragmented and often confusing approach to intergovernmental coordinations.

INSTITUTIONAL TRENDS

The survey findings also revealed that certain recent institutional trends in the planning and administration of Federal programs will have a significant impact on water quality management planning.

> Regional offices of Federal agencies are playing an increasingly significant role in grant-in-aid program planning and administration.
>
> The States are assuming increased responsibility in the planning and administration of Federal grant-in-aid programs.
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> Substate district planning agencies, now serving nonmetropolitan areas of some 40 States, are rapidly blanketing the nation and are being used increasingly by the States for planning and administration of Federal and State programs and as Regional A-95 Clearinghouses.

CONCLUSIONS

When the impediments to nonmetropolitan water quality management planning are viewed in light of recent trends, several major conclusions can be drawn concerning ways to improve the process:

The objectives of management planning can best be achieved by designing an overall planning strategy to coordinate water quality planning requirements systematically with other related areawide planning programs on a district-by-district basis.

State-designated substate district planning agencies constitute a major resource for the accomplishment of such planning on an areawide basis.

Timetables for the completion of areawide water quality management plans in nonmetropolitan areas would be more effective if scheduled on the basis of a realistic assessment of the institutional capabilities of substate district planning agencies, their overall planning accomplishments and anticipated planning progress.

State and regional A–95 Clearinghouse agencies can play a key role in accomplishing the intergovernmental and interagency coordination needed for effective water quality management planning.

Designated State water quality (planning) agencies, in addition to their other duties, are in the best position to serve as a clearinghouse for technical assistance to areawide planning agencies for water quality management planning.

EPA Regional Offices are the logical focal point for coordination among EPA, HUD, FHA, EDA, the States and their substate district agencies for putting into effect an areawide water quality management planning process in nonmetropolitan areas.

Nonmetropolitan water quality management planning will proceed slowly at best until funds are made available to support the required effort.

The above conclusions led to the identification of the need to:

1. Bring State-designated nonmetropolitan substate planning and development districts into active participation with State and Federal agencies in the intergovernmental decision-making process.
2. Design flexible planning guidelines for water quality management planning in nonmetropolitan areas to make maximum use of existing planning institutional capabilities and on-going areawide planning activities.
3. Develop a coordinative approach to water quality management planning throughout the full range of the intergovernmental decision-making process.
4. Promote a better understanding of the purposes and benefits of water quality management planning on the part of other Federal agencies, the States and substate district officials.
5. Provide increased funds for water quality management planning in nonmetropolitan areas.

Substate districts

The need for a strong role for nonmetropolitan substate district agencies in the water quality management planning process is summarized below:

Water quality problems in rural areas are not receiving adequate attention through existing water quality management planning undertaken primarily at the State Level;

Planning efforts and priorities at the State level are often geared to the pressing demands and problems of urban areas;

Nonmetropolitan substate district organizations are evolving as an integral part of the governmental structure in the great majority of States;

The planning and development activities being undertaken by them will have a significant impact on water quality management;

Conversely, the water quality management planning process, when fully implemented, has the potential to profoundly influence nonmetropolitan planning and development programs;

Although the concept of water quality management planning is not well understood, lack of understanding stems in part from the failure of nonmetropolitan district agencies to be involved in the planning process; and

The most effective method of analyzing nonmetropolitan water quality management problems and linking water quality management planning to other planning and development activities is through the active participation of nonmetropolitan district agencies in the preparation of areawide water quality management plans.

A flexible approach

Realistic recommendations for improving water quality management planning in nonmetropolitan areas must be based on a recognition that the current status of nonmetropolitan substate district agencies varies greatly across the country. This uneven progress has resulted in differences in quantity and quality of their completed and on-going areawide planning efforts.

To effectively implement the rigorous, technically oriented planning process required by EPA in its Guidelines for Water Quality Management Planning, flexible approaches and planning requirements need to be devised. Variables which need to be considered include:

The organizational status of nonmetropolitan district planning agencies;

The planning capabilities of nonmetropolitan district planning agencies;

The required content of areawide Water Quality Management Plans for nonmetropolitan areas;

Timetables for meeting water quality management planning requirements in nonmetropolitan areas.

EPA's short-range objectives should be to directly involve nonmetropolitan district agencies in areawide water quality management planning. The strategy should revolve around an incremental approach designed to support the building of their institutional capability. The long-range goal should be the eventual achievement of realistic areawide Water Quality Management Plans for most nonmetropolitan areas.

Improved intergovernmental coordination

The need for improved coordination at all levels is closely related to the need for flexible approaches to planning requirements. The survey found that national agreements between Federal agencies do not assure that interagency coordination will be accomplished. The failure to date to implement unification of the HUD-EPA planning requirements illustrates the need for improved communication and coordination at all levels.

Fexibility in Federal requirements is also needed to improve intergovernmental planning coordination. Since the several Federal agencies supporting nonmetropolitan planning have their own areawide organizational and planning requirements, as do many of the States, planning strategies based on flexible requirements geared to the problems and existing institutional capabilities of nonmetropolitan district agencies need to be worked out at the Federal Region and Statewise levels.

Designing a flexible approach

The following considerations require examination in designing a flexible approach:

1. The overall mission and related planning and program priorities of the district agency;
2. The institutional capabilities and planning accomplishments of the district organization; and
3. The nature and severity of water quality problems in each nonmetropolitan district.

In assessing the overall mission and related planning and program priorities of nonmetropolitan district agencies, particular emphasis should be placed on the impact their missions may have on certain EPA and HUD organization and planning requirements. The planning priorities of nonmetropolitan district agencies usually involve economic development projects, manpower training, and planning for the provision of certain basic services, both to serve as economically disadvantaged population and to simulate economic development.

On the other hand, the planning priorities of most existing areawide planning agencies in metropolitan areas reflect physical planning needs related to areawide land-use, housing, transportation and open-space planning.

As a consequence of these differences, some nonmetropolitan agencies, particularly those that are underfunded and understaffed, sometimes find it difficult to accommodate HUD's planning priorities with their development-oriented missions. This problem can have a significant impact on the accomplishment of EPA's areawide water quality management planning requirements in nonmetropolitan areas since EPA now requires areawide planning agencies to meet HUD's organizational and planning requirements.

These problems can be illustrated through analyzing the difference in the objectives of functional water and sewer planning between metropolitan and nonmetropolitan areas. The planning of water, sewerage and treatment facilities is seen as a prime tool to control and influence growth in metropolitan areas. Consequently, these functional planning efforts must be closely coordinated with land use, transportation and open-space planning.

Conversely, nonmetropolitan agencies often view planning for the provisions of water and sewerage facilities as a prime tool to stimulate growth. Thus, functional water/sewer planning in nonmetropolitan areas is often tied closely to economic or industrial development planning accomplished through the OEDP process. Detailed land-use planning is not a major priority for these areas, especially those with a sparse and scattered population.

On the other hand, the capacity of planned waste collection and treatment systems is significant in the nonmetropolitan setting. To both stimulate and anticipate future growth, nonmetropolitan sewerage facilities plans often provide for systems with capacities larger than needed to serve the existing population. However, this "over-design" conflicts with EPA's cost-effectiveness planning strategy.

A final solution to these problems cannot be provided for in any framework for evaluating the institutional capabilities of nonmetropolitan district agencies. Nevertheless, they must be taken into account in devising flexible approaches to water quality management planning in nonmetropolitan areas.

RECOMMENDATIONS

The findings and conclusions from the survey form the basis for a recommended approach by which the Environmental Protection Agency can provide the leadership to bring about improved water quality management planning practices in nonmetropolitan areas. Furthermore, the following recommendations are designed to allow for incremental improvements in problem assessment and planning capability.

It is recommended that EPA-OWP, in recognition of the potential of substate district planning and development agencies for institutionalizing the water quality management planning process in nonmetropolitan areas, lend all possible support and encouragement to State actions:

1. *Requiring* Nonmetropolitan Areawide Water Quality Management Plans *for all nonmetropolitan areas which are served by a State-designated substate district planning agency.*
2. *Assigning responsibility for the development of* Nonmetropolitan Areawide Water Quality Management Plans *to officially designated substate district planning and development agencies unless such action is clearly unwarranted.*

To permit the varying levels of detail necessary to reflect the diversity of problems and institutional capabilities in nonmetropolitan areas, it is recommended that EPA-OWP:

3. *Establish flexible planning requirements for* Nonmetropolitan Areawide Water Quality Management Plans *designed to insure realistic consideration of nonmetropolitan areawide water quality problems and maximum utilization of related planning activities.*

To reinforce and otherwise support the role of substate districts in areawide water quality management planning for nonmetropolitan areas, it is recommended that EPA:

4. Correlate the deadlines for completion of initial Nonmetropolitan Areawide Water Quality Management Plans *with the availability of water quality management planning funds and with implementation schedules established in the water pollution control amendments of 1972.*

5. Include planning status and performance assessments in interim criteria for facility grant eligibility pending satisfactory completion of each district's Nonmetropolitan Areawide Water Quality Management Plan.

6. Prepare technical handbooks and other information on nonmetropolitan water quality problems for use by substate planning agencies in developing Nonmetropolitan Areawide Water Quality Management Plans.

7. Establish a nontechnical information and educational program to build understanding of the purposes of, and the need for, cost-effective water quality planning on the part of local officials.

8. Encourage maximum involvement of State A–95 Clearinghouse agencies in all aspects of water quality management planning.

And, finally, if water quality management planning is to be accomplished in nonmetropolitan areas quickly enough to affect expenditures in the time frame envisioned in the water pollution control amendments of 1972, it will have to be funded on an accelerated basis. *Therefore, it is strongly recommended that:*

9. Every effort be made to stimulate and fund water quality planning grant applications from State-designated substate district planning agencies.

10. Federal and State agencies supporting water quality related planning should be encouraged to increase their technical and financial support for such planning, and to coordinate their implementation timetables and planning requirements whenever possible.

RECOMMENDED ACTIONS

The following actions to implement the above general recommendations were designed to allow for incremental improvements in problem assessment and planning capability as well as for major improvements should more planning funds become available.

Plan content

To assure that nonmetropolitan areas are covered by areawide water quality management plans and to avoid confusion over required plan coverage, *it is recommended that the current language of the Guidelines calling for areawide "Metropolitan/Regional" plans be changed to specifically require areawide plans for Nonmetropolitan areas.*

All Nonmetropolitan Areawide Water Quality Management Plans should reflect consideration of certain basic elements. The detail accorded each element should be appropriate to the extent of the area's water quality problems and their relationship to other area plans. The appropriate level of detail should be determined in the design of the overall water quality planning program for the area.

The following elements should be addressed in every Nonmetropolitan Areawide Water Quality Management Plan:

A statement of water quality objectives and how they relate to areawide goals and objectives.

A description of the location, type and extent of municipal, industrial and nonpoint sources of water pollution in the area.

A description of existing physical systems for collection, transmission and treatment of waste water.

A description of the water resources within or available to the area.

A land-use inventory which identifies present urban concentrations, major use generators and trends, major land uses in the nonurban areas and their generators, and anticipated changes which would have significant impact on water quality management.

An economic and social analysis of the area which considers the size, economic base and present and anticipated growth rate of the area and its urban places.

A statement of current water quality standards and identification of river reaches where these standards are not currently being met.

Estimates of volume, type and location of future waste inputs which result from anticipated population, industrial and agricultural growth.

A statement of the strategy selected to achieve water quality objectives for the area based on analyses of water pollution problems, abatement alternatives, cost effectiveness considerations, area priorities and financial and manpower constraints.

A statement of the environmental impact of the alternative selected.

A statement of the extent of public participation in the planning process.

An analysis of the legal, regulatory and jurisdictional factors related to implementation of the areawide management plan.

A description of the procedures to be followed in updating the plan.

Planning work study design. Whenever a Federal grant is awarded to support areawide water quality management planning, a detailed work study design should be the key mechanism for coordinating interagency and intergovernmental planning efforts. Its preparation should be undertaken as the first phase of the areawide plan and should be considered an eligible planning cost by EPA. The full grant award should be conditioned upon the grantee's preparation, and EPA Regional Office approval, of the work study design within sixty to ninety days after the initial grant agreement has been signed.

The work study design should also develop in detail arrangements for accomplishing each functional component of the plan, including specific provisions for interagency cooperation through data sharing, staffing support and joint funding; and procedures for coordination among the areawide agency, the State water quality planning agency, the State Comprehensive Planning Office, other State agencies, and Federal agencies conducting related programs. It should also spell out in detail how areawide water quality planning efforts will be linked with previous or on-going HUD, FHA or EDA-funded planning involving land use, water needs, or water and sewer facilities. Particular emphasis should be placed on linking the areawide planning efforts with on-going river basin planning conducted at the State level.

Finally, the work study design should identify recognized sources of technical planning capability available to the areawide planning agency such as SCS County Agents, Extension Service personnel, Resource Conservation and Development agencies, and State agency field personnel, and describe arrangements for utilizing these technical resources.

In short, the work study design should establish clear channels of on-going areawide-State-Federal communications that remain functional throughout the period of the planning grant and beyond. In many instances, it may be desirable to employ professional consultants to prepare the work study design, through a subcontract with the applicant areawide planning agency. To avoid any potential problems with interagency conflicts, the consultant should perform the role of neutral arbitrator in resolving problems concerning who does what, when, where and how throughout the period of the planning grant.

Planning responsibility

To achieve maximum effectiveness, nonmetropolitan substate district agencies must have a direct programmatic role in water quality management planning. This is particularly necessary since pollution control problems in rural areas are often substantially different from urban problems and can best be examined at the planning level closest to the problems, in conformity with the overall strategy set by the State.

It is therefore recommended that State-designated substate district agencies be assigned responsibility for development of Nonmetropolitan Areawide Water Quality Management Plans *for their respective areas unless it can be clearly demonstrated that some other agency should be assigned the responsibility.*

Since requirements for comprehensive or coordinative planning and organizational arrangements vary among Federal agencies supporting nonmetropolitan planning, and since several States have their own planning and organizational requirements for substate districts, EPA should adopt a flexible approach to unification of Federal planning requirements by requiring only that nonmetropolitan agencies designated as responsible for water quality management planning be the official substate district organization and the regional Clearinghouse designated pursuant to Circular A–95. Where no district agencies have been designated or organized, this requirement should be waived and the nonmetropolitan areas covered in the appropriate river basin plans.

In nonmetropolitan areas where full scale areawide water quality management planning is supported by a Federal grant, the areawide planning agency also will, in all probability, need to subcontract with consultants, or other agencies with recognized capabilities, for discrete parts of the planning effort. In all cases, however, the district agency should play the key role in the development of the plan through close monitoring of the consultant's progress, and by providing the main inputs on areawide goals and objectives, economic and demographic data and projections, and plan relationships. The details for these arrangements should be spelled out in the work study design.

Planning coverage

It is recommended that EPA-OWP modify agency guidelines and directives relating to water quality management planning to require that a "Nonmetropolitan Areawide Water Quality Management Plan" be prepared for all areas outside SMSA boundaries served by a State designated substate district planning agency. An exception would be a small nonmetropolitan area included in the Metropolitan Water Quality Management Plan for an adjacent SMSA. Those areas not presently served by a substate district agency should be included in appropriate detail in river basin plans covering the area.

The geographic scope of sub-area water quality management plans should be worked out on a district-by-district basis instead of relying solely on HUD designated APJs. The survey found that APJs and substate districts are often not coterminous. However, if areawide water quality management planning proceeds on the basis of officially delineated substate districts, where district organizations have been established, the geographic scale and organizational arrangements for planning sub-areas can be worked out for each district.

This procedure should allow for increased flexibility over the current approach which is geared to HUD's planning certification procedures. The district agency would have prime responsibility for establishing water quality management systems within the region. Initially, it would establish the necessary organizational arrangements for developing plans for geographic sub-areas within the district. For example, in some districts more detailed plans may be necessary for the larger cities and towns of the district, while other planning sub-areas may need to be defined for rural areas where nonpoint source problems are prevalent. In other districts, a unified plan may be required for the entire area to include both rural and urban components.

In some districts, an agency such as a county planning commission or water and sewer authority may be delegated responsibility for preparation of a water quality management plan for a "Problem Analysis Sub-Area". In all cases, however, the planning activity should be conducted under the organizational umbrella of the substate district agency. After a management planning process has been implemented for the entire area, the district agency's prime responsibility would involve coordination of the area's individual water quality management systems into coordinated areawide management system.

These determinations should be reached through consultation and negotiation among the district agency, the State water quality planning agency and the State Planning Office, and spelled out in the planning work study design phase of the plan's preparation. The EPA Regional Office should approve the planning arrangements for each district by reviewing the work study design prior to authorizing further planning expenditures under the district's Federal water quality management planning grant.

State agency role

It is recommended that EPA require the States to pursue the following general procedure to implement water quality management planning in nonmetropolitan areas;

1. Conduct an assessment of the water quality problems in nonmetropolitan areas throughout the state.

2. Conduct an assessment of the planning accomplishments and capabilities of designated substate district planning agencies throughout the state.

3. Identify the most critical water quality problems in nonmetropolitan areas and designate them for inclusion in a special analysis element of either a river basin plan or a Nonmetropolitan Areawide Water Quality Management Plan.

4. Identify those substate district planning agencies which are "ready" to undertake the preparation of their Nonmetropolitan Water Quality Management Plan, *and assist them in preparation of a Federal planning grant application.*

5. Assist those substate planning agencies not yet "ready" to undertake formal preparation of their Nonmetropolitan Water Quality Management Plan in identifying modifications to current planning work programs which can be accomplished (within current funding levels) to support the development of a water quality management plan at some future time.

6. Establish a timetable for completion of current and anticipated planning programs which will enhance each district agency's capability to develop an areawide water quality management plan.

7. Establish, in conjunction with the EPA Regional Office, planning progress indicators for each substate district to assist in determining EPA construction grant eligibility.

The State water quality planning agency should be responsible for coordinating these procedures with the State comprehensive planning office and each substate district director. In addition, close communication should be maintained with the following agencies:

EPA Regional Offices
HUD Regional and Area Offices
FHA State Offices
EDA Regional Offices and State Economic Development Representatives in States where at least one EDD has been established.

Assessing capabilities

The State Planning Office (in conjunction with representatives of State Departments of Local or Community Affairs, where they exist as separate agencies) is the appropriate agency to prepare an assessment of the current status of areawide planning in each State-designated information concerning:

The type of areawide planning organizational designations for each nonmetropolitan planning agency (EDD, NMD, LDD, COG, State-designated substate district, RC&D, etc.);

The organizational progress of the State-designated district agency (staff, governing board, Clearinghouse designation, functional committees, HUD organizational certification, water quality planning designation, etc.);

The current and anticipated funding (EDA, HUD, FHA, State, local, etc.);

The current status of completed and on-going planning efforts (OEDP, statement of goals and objectives, level of HUD planning certification, including Land-Use and Housing Elements, HUD and/or FHA water and sewer functional planning, etc.)

The sources of other technical assistance and planning support available to the planning agency (Rural Development Committees Extension Service, SCS, RC&Ds, Forest Service programs and personnel; and State field personnel, etc.)

Assessing water quality problems

More attention needs to be devoted in river basin and areawide water quality management planning efforts to analyzing water quality problems in rural or nonmetropolitan areas, and to identifying and examining alternatives for achieving water quality objectives in these areas.

A functional water quality management planning process is a particularly urgent need in those nonmetropolitan areas where the existence of dispersed water pollution sources often makes the construction of additional waste treatment facilities an inefficient or infeasible alternative.

The survey found that such problems as soil erosion, agricultural wastes and run-offs, subsurface drainage, and pollution associated with rural based industries such as logging and mining, are receiving practically no attention through the water quality management planning process. Correspondingly, such alternatives as joint disposal, improved soil conservation practices, disposal lagoons for agricultural wastes, aeration stabilization ponds, septic tank maintenance, and natural aeration processes are also receiving little consideration in on-going water quality management planning.

These problems should be examined through assessment of existing and potential water quality problems for all nonmetropolitan areas in each State. This assessment should be the prime responsibility of the State water quality agency, and should categorize nonmetropolitan water quality problems in terms of industrial, municipal and non-point sources. The focus of this effort should be the identification of significant water quality problems which prevail in each nonmetropolitan district. (Further discussion of this assessment can be found in Appendix A.)

In preparing this assessment, the State water quality planning agency should rely on existing planning documents and supporting data that has been generated by each nonmetropolitan district agency, and on advice and technical assistance from such agencies as the SCS, Agricultural Stabilization and Conservation Service (ASCS), U.S. Forest Service, local health departments the Corps of Engineers, river basin planning commissions, and State agencies with responsibilities for water supply, agriculture and natural resources programs.

Determining planning readiness

On the basis of these assessments, the State water quality planning agency, in conjunction with the State Planning Office and EPA, can determine which district agencies are "ready" to apply for a Federal grant to support areawide nonmetropolitan water quality management planning. This determination should be based on:

The existence of special water pollution problems which should receive priority consideration in the planning process and the delineation, where necessary, of planning sub-areas within substate districts as "Problem Analysis Areas" where special organizational arrangements, accelerated planning schedules, or more rigorous and detailed water quality management plans need to be developed.

The extent of completed and on-going district planning activities related to the water quality management planning process.

The availability of completed and on-going planning activities of other agencies within the district which may be related to water quality management planning.

Agreed upon modifications in the district agency's work program that can be accomplished within current staffing and funding levels and which would contribute to the development of the district's Nonmetropolitan Areawide Water Quality Management Plan.

The availability of other technical and planning resources to the district planning agency.

If the EPA Regional Office approves the State's determination that the district agency is "ready," an application for a Federal planning grant should be prepared. If the district planning agency is not considered "ready" by the State and the EPA Regional Office, or a Federal planning grant is not available, the following steps should be taken:

The future planning activities to be undertaken by the district agency should be reviewed to determine their relationship to the development of a Nonmetropolitan Areawide Water Quality Management Plan for the district;

Planning progress indicators which will be considered in determining EPA construction grant eligibility should be negotiated.

Establishing planning timetables. These progress indicators should be geared to timetables for meeting Federal planning requirements, particularly those of HUD and EPA. This schedule should be based on a realistic assessment of when nonmetropolitan district agencies will make the necessary institutional progress, in terms of organization, staffing, funding and accomplishment of basic comprehensive and functional planning tasks, to undertake EPA's planning requirements.

The preparation of schedules and timetables for meeting Federal planning requirements in nonmetropolitan areas on a district-by-district basis can serve as an indicator for establishing EPA and HUD policies concerning planning requirements and grant eligibility. This procedure, if based on a realistic assessment of the existing situation in nonmetropolitan areas, will no doubt involve waiving some of the EPA requirements for "fully developed" areawide plans considerably beyond the current July 1, 1973 deadline.

Furthermore, if such a procedure is followed in each of the twelve Federal Regions, it will provide EPA headquarters with a composite national picture of the current status of areawide planning in nonmetropolitan areas and the progress that can be expected in accomplishing water quality management planning for these areas.

Delivering technical assistance. The States should also prepare a statewide program design for the provision of technical assistance to support substate district agencies in the development of areawide water quality management plans. Emphasis should be placed on the coordinated management of all technical resources within the State capable of providing assistance to nonmetropolitan district organizations. This program design should be the joint responsibility of the State Comprehensive Planning Office and the State water quality agency. It should identify sources of technical assistance from Federal and State agencies and require substate agencies to develop coordinative procedures and working arrangements for technical support from field personnel of such agencies as the Soil Conservation Service, the Federal-State Extension Service, the U.S. Forest Service and the Corps of Engineers.

Coordination of Federal programs

To support the States and their nonmetropolitan planning and development agencies in implementing a water quality management planning process for nonmetropolitan areas, EPA should continue to work toward improved coordination of the Federal planning requirements to HUD, FHA and EDA, and in addition, should strengthen coordinative procedures at the Federal Region, State and areawide levels.

The following actions are recommended to further improve planning coordination.

EPA should recognize, and encourage HUD to recognize, State designation of an agency for substate district planning purposes and for A-95 Clearinghouse responsibilities as the only requirements for areawide organizational and coordinative planning certification for water quality planning in nonmetropolitan areas.

EPA should support a study to analyze in detail existing planning requirements of Federal agencies supporting water quality related planning in nonmetropolitan areas to identify those planning activities which are useful to areawide water quality management planning. The study should also identify (1) commonalities in terms of nomenclature, procedures, requirements and standards, and (2) differences among existing requirements which result from law, legislative intent, basic agency policy, as well as those which seem to result from agency preference.

EPA should help EDA design the environmental assessment element of the OEDP to be of maximum value to water quality management planning as well as to other environmental planning required by EPA.

EPA should encourage its Regional offices to work with HUD and the States to allow scheduling, where appropriate, of a water quality management planning element as a phase of functional areawide water/sewer planning supported through "701" grants.

EPA Regional offices should work with FHA State offices and the States to build into FHA planning grant agreements additional EPA requirements for water quality management planning.

Functional planning requirements. The study of FHA, EDA, HUD and EPA planning requirements should be based on an analysis of the specific planning activities required by each agency for functional plans related to water quality. These requirements, or planning inputs, should then be compared with completed plans funded and approved by each agency on the basis of their own requirements. Such a comparison of planning inputs (requirements) and planning outputs (completed plans) should help clarify the additional planning inputs EPA considers necessary for adequate water quality management planning.

For instance, EPA planning officials should examine EDA-approved OEDPs to determine if any of the information developed therein provides some basis for the development of a water quality management plan. Once this determination is made, EPA can work with EDA to determine how nonmetropolitan districts can build upon the information developed in their OEDPs to provide a sounder basis for an areawide water quality management plan at a future date.

Since EDA is currently developing guidelines for the inclusion of an environmental assessment as part of the OEDP process, it is suggested that EPA aid EDA in developing these guidelines so that they can be of maximum value to water quality management planning as well as to other environmental planning.

Improved coordination of EPA-HUD functional planning can be achieved by scheduling a water quality management planning element as part of HUD's areawide water/sewer planning. This schedule should be negotiated among HUD and EPA Regional offices, the State Planning Office, the State water quality planning agency and the district planning agency involved. The EPA Regional Office should play a leading role in this effort by reviewing all completed HUD areawide water/sewer plans for each nonmetropolitan area and all current Annual Work Programs for those district planning agencies receiving HUD "701" funds. This review can provide the basis for an analysis of those water quality planning elements which have not been adequately accomplished for the area.

On the basis of this review and the assessment of planning institutional capabilities and nonmetropolitan water quality problems previously described, negotiations should be undertaken with HUD, the State Planning Office, the State water quality planning agency, and each nonmetropolitan district planning staff, concerning a work plan for a water quality planning element.

It would be nearly impossible to set forth a standard format for such a water quality planning element due to vast differences in plan content of HUD-approved functional water/sewer plans, in the institutional capabilities of substate district planning agencies, and in the nature and severity of water quality problems in nonmetropolitan areas. The advantage of this approach is that it provides a flexible framework for dealing with this diversity while at the same time accomplishing at least a portion of EPA's areawide water quality planning requirements through the HUD "701" program.

EPA-FHA planning should continue to be coordinated by building water quality management planning requirements into FHA rural water/sewer planning requirements. The survey revealed that FHA officials in each State were including certain water quality planning requirements into FHA grant agreements with planning agencies in nonmetropolitan areas. The specifics of these planning tasks varied depending on the quality and quantity of available information and State Office interpretations of FHA's grant authority. In some States, FHA rural water/sewer plans are submitted to the State water quality planning office for review with respect to EPA's planning requirements. Recent FHA directives require this procedure to be followed for all FHA water and sewer plans.

This type of Federal coordination can have a significant impact on accomplishment of at least some of EPA's planning requirements in rural areas. EPA Regional Offices should continue to maintain close communication with FHA in order to improve the water quality aspects of FHA planning.

EPA Regional offices, along with State comprehensive planning offices and water quality planning agencies, should also promote the coordination of FHA and HUD areawide water/sewer planning. Coordination should take the form of a single planning document, jointly funded, to meet the comprehensive planning requirements of both HUD and FHA. In other words, areawide land use elements, population and economic studies, and goals and objectives ordinarily prepared to meet HUD's "701" Areawide Planning Requirements should also be used to satisfy FHA and EPA requirements. In addition, whenever possible, HUD and FHA water/sewer planning should be timed to coincide, allowing the areawide planning agency to prepare a single areawide water/sewer plan to satisfy both HUD and FHA requirements.

The cost of developing the planning document should be shared by both HUD and FHA whenever both agencies have awarded planning grants to the same areawide planning agency. The cost to each agency should be prorated with FHA funding water/sewer planning for rural areas and communities under 5,500 population, and HUD funding planning for the remaining urban areas in the district not eligible for FHA funding.

These and other opportunities for interagency planning coordination should be carefully examined by the interagency committee working to unify Federal planning requirements for functional water/sewer-water quality planning. Such an approach should enable EPA to work with HUD, EDA and FHA to build on existing planning efforts rather than requiring the States and their nonmetropolitan district agencies to ignore existing plans and begin developing an entirely new planning process to meet EPA requirements.

Finally, efforts to unify Federal planning requirements should also identify ways to present planning incentives to district agencies and their member local governments. For instance, all four Federal agencies should work to design planning programs which provide for establishment of locally determined priorities through the planning process, and which give assurance that these local priorities will influence the setting of priorities by State and Federal agencies.

Strengthening the A–95 process

To effectively involve nonmetropolitan substate district agencies in the water quality management planning process and to improve Federal-State-areawide communication, *it is recommended that EPA and the States encourage maximum involvement of State A–95 Clearinghouses and/or State comprehensive planning offices (SPOs) in all aspects of water quality management planning.*

To more effectively employ the A–95 Clearinghouse process at the State and areawide levels, it is recommended that *EPA, in cooperation with OMB, support a study to develop criteria and guidelines which define and describe the optimal role of Clearinghouse agencies in influencing water quality management planning in nonmetropolitan areas.* Such criteria and guidelines for the effective use of the A–95 process in water quality management planning should be based on evaluations of the experience of State and nonmetropolitan Clearinghouse agencies in administering the A–95 process.

Planning grants for nonmetropolitan districts

If water quality management planning is to be accomplished in nonmetropolitan areas quickly enough to affect expenditures in the timeframe envisioned in pending water quality legislation, it will have to be funded on an accelerated basis. Therefore, it is strongly recommended that:

> *Every effort be made to stimulate and fund Federal planning grant applications from State designated substate district planning agencies for nonmetropolitan areawide water quality management planning.*
>
> *Federal agencies supporting water quality-related planning should be encouraged to increase their technical support for such planning, as well as to coordinate their planning requirements and implementation timetables whenever possible.*

In determining priorities for Federal funding, EPA Regional offices should carefully examine all nonmetropolitan areas on a State-by-State basis, relying on the assessments of district planning readiness and nonmetropolitan water quality problems.

In those nonmetropolitan areas with specific problems distinct from the usual water quality management planning problems associated with population growth, allocation of waste loads, or opportunities for regionalization of municipal treatment facilities, EPA should consider funding a "special problem area study" on a priority basis. Special problem area amenable to such an approach might include pollution problems associated with agricultural, surface mining or timber production, solid waste disposal, outdoor recreation, or climatic and geological conditions. This type of functional water quality planning could be funded with a small Federal grant, or perhaps through other EPA categorical grants for research and planning.

In addition, EPA should explore the possibility of joint funding with other Federal program agency sources, such as SCS, the Corps of Engineers, ASCS, the U.S. Forest Service, or through cooperation with university Water Resources Research Institutes receiving Federal research grants from the Water Resources Council. In some instances, EDA Technical Assistance Grants can be used to examine water quality problems in eligible areas where industrial development or expansion is held back due to industrial pollution problems.

Recommendations for an information program

It is recommended that EPA support the overall objectives of water quality management planning by establishing a nontechnical information program designed to build understanding of the purposes and need for cost-effective water quality planning and to prepare a technical handbook on nonmetropolitan water quality problems for use by substate planning *agencies in developing the* Nonmetropolitan Areawide Water Quality Management Plans.

State and areawide agencies should not continue to view water quality management planning as another requirement that must be accomplished in an expedient manner in order to receive Federal construction grants. Any specific recommendation for improving or implementing water quality management planning in nonmetropolitan areas must be supported by a concerted effort on the part of Federal agencies to inform the responsible State and local officials of the benefits which can result from effective management planning.

Cost-effectiveness is a difficult concept to sell State and local governments accustomed to working with Federal categorical grant programs. The existing system has promoted an almost universal attitude of "grantsmanship" whereby State and local officials attempt to maximize their Federal project grants. However, the States can benefit from management planning by applying the cost-effectiveness approach to State funds budgeted to match Federal construction grants under Section 8 of P.L. 660.

The States can also employ an effective management planning process to complement existing regulatory and enforcement responsibilities of State water quality agencies. The survey produced numerous examples of the need to link water quality management planning with other on-going planning and development activities at the State level. The most obvious examples include planning for industrial development, housing, water and waste disposal systems, outdoor recreation and natural resource conservation and development. If water quality management planning is not linked now to planning for these and other related activities, the States will find their future policy options for water quality management seriously circumscribed. The States must realize that if the present trend of reliance on regulatory controls and enforcement prevails, their funding priorities will continue to be geared to remedial solutions designed to maintain water quality standards.

Management planning problems in nonmetropolitan areas. Officials of most nonmetropolitan planning organizations also need to be convinced of the desirability and necessity of their participation in the water quality management planning process. They should be aware of the potential impact water quality management planning has on every aspect of their overall missions. Many nonmetropolitan planning staffs do not realize the impact water quality considerations will have on the future economic growth and development of the area, and the impact water quality management planning can have on many of their current plans and programs.

In addition, nonmetropolitan planning officials need to recognize the implications of their failure to develop areawide Water Quality Management Plans. If they abdicate their role in developing areawide plans, water quality planning for their area will be accomplished, but by the State through the required river basin plans. The prospects for achieving meaningful local inputs and for accurately linking areawide planning and priorities with river basin planning will be seriously diminished when substate district agencies do not have a major role in the planning process.

Finally, other incentives for planning need to be presented to nonmetropolitan planning agencies. In essence, the need for comprehensive and functional planning has been sold to local officials on the grounds that areawide goals and objectives should be determined at the local level, and that priorities for project implementation will be locally determined to achieve these goals and objectives.

However, the overriding goal of water quality management planning is the maintenance or achievement of water quality standards which are set at a higher level of government—either State or Federal. The immediate objective is the determination of cost-effectiveness of Federal funds. Although local funds must also be committed to support project costs, priorities for implementation are not locally determined. In the words of one EPA Regional Office Planning Chief:

> Implementation schedules depend on basin and interbasin priorities, local funding capabilities, State assistance (if available) and anticipated Federal revenues, primarily from Section 8 of P.L. 84-660 as amended . . . . *Water quality standards are the initial basis for designing facilities and a cost-effective implementation of Section 8 funds should be the focus of the planning process.* (emphasis added)

This type of planning function may be less difficult to sell to metropolitan planning staffs whose overriding mission often involves the regulation and control of growth rather than the stimulation of growth and development. Even in these areas, however, the planning function, to be totally effective, must make provisions for local determinations on planning strategies and project priorities.

Again, quoting from the same source on HUD planning procedures and objectives:

> Implementation periods (for HUD grants) are determined locally and are a function of local growth characteristics . . . Typically, all communities who have complied with the HUD functional planning requirements are of equal priority and funds are allocated until monies are unavailable.

There is no easy answer to this dilemma. Clearly, EPA planning must be concerned with broad water quality goals for entire river basins, often at the expense of local priorities. To develop effective areawide Water Quality Management Plans for nonmetropolitan areas, however, some accommodation with local priorities needs to be made. Until local communities and their areawide planning staffs feel they have at least equal influence with State and Federal agencies in a balanced intergovernmental management planning system, it is doubtful that an effective water quality planning process can be fostered in nonmetropolitan areas.

On the contrary, whenever local officials and planning staffs view the planning process as a tool which primarily benefits Federal and State agencies in making allocation decisions within a larger statewide, regional or national context, incentives for a realistic, locally oriented planning function are removed and the planning process often becomes a sterile exercise in grantsmanship.

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